DRUG-RELATED MORTALITY

PERSPECTIVES ACROSS EUROPE

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Foreword

This monograph published by the European Collaborating Centres in Addiction Studies (ECCAS) continues its tradition of highlighting the major problems that face substance misusers and society across Europe, and presenting viable solutions to these problems.

Monitoring trends and patterns of drug-related deaths continues to prove useful in describing the changing nature and extent of drug abuse, providing useable information for the early identification of emerging problems. When used in conjunction with other indicators of problematic drug use – accident and emergency episodes, urine toxicology, forensic laboratory reports, etc – drug-related death data can inform the development and administration of a reliable and valid early warning system for drug problems which in turn enhances preventative efforts.

In this volume, the contributors have articulated the problems associated with the collection of drug-related death data in various countries across Europe, and have provided suggestions on how these can be addressed. Recent reports of the increased prevalence of various consequences of drug abuse – hepatitis C infection, morbidity associated with designer drugs, poisoning due to adulterants, etc., affirm the timeliness of this publication.

I commend my colleagues, Adenekan Oyefeso, Alex Baldacchino and John Corkery for having brought together such a resourceful group of experts from across Europe and I commend these contributors for their effort and commitment in producing a pioneering collection of substantive chapters on a very important, but largely neglected, subject matter.

The European Collaborating Centres in Addiction Studies have again demonstrated the value of transnational collaboration in addressing matters of concern to clinicians, researchers, policy-makers and, most importantly, to the group that we serve – substance abusers.

January 2002
Professor Hamid Ghodse
President
European Collaborating Centres in Addiction Studies

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Part I

Introduction

Chapter 1 Drug-related mortality: conceptual and methodological issues

A Oyefeso, C Clancy and H Ghodse

Introduction

Drug-related mortality is a definitive index of the severity of drug abuse and dependence from both clinical and public health perspectives. It provides information about the natural history of addiction, emergence of, and increase in, drug abuse-related problems. In the United Kingdom (UK), for instance, Ghodse et al (1995, 1998) demonstrated the impact of barbiturate prescribing on drug-related mortality in the late 1970s and 1980s. The subsequent regulatory control of barbiturates in the UK in the mid-1980s resulted in a sharp decline in barbiturate-related mortality. In this example, mortality data have not only revealed a growing epidemic but have also demonstrated how these data can be used to evaluate the effectiveness of drug regulatory control policies.

Similarly mortality data provided evidence on the emergence of HIV/AIDS in the 1980s. These data revealed an epidemic of AIDS where the disease became the second leading cause of death in the United States (US) between 1989 and 1991 in men aged between 25 and 44 years (Centre for Diseases Control and Prevention (CDC:1993). Subsequent clinical and public health responses to the scourge of AIDS has resulted in the decline of AIDS in the US and Europe.

This chapter provides a conceptual context for this volume by describing the qualitative and quantitative dimensions of drug-related death (DRD). The issues addressed include definitions and classifications, standardisation of DRD data and transnational comparability.

Definition and classification of DRD

Once a person is certified dead, the question arises, what is the main or underlying cause of death? Is the death caused directly or indirectly by ingestion of a particular drug? In other words, is the death drug-related? There are various definitions of what is a drug-related death. Firstly, in the field of addiction, the term ‘drug’ often refers to a psychoactive substance with proven abuse liability and dependence potential, irrespective of its legal status. Drugs such as heroin, cocaine, amphetamines, MDMA, cannabis, etc. fall into this category. Other psychoactive drugs also considered in the field are those with proven therapeutic value but can also be consumed in quantities way beyond established therapeutic limits, e.g. antidepressants.

Secondly, there is a general acknowledgement that the term ‘drug-related death’ is overinclusive. Consequently, most studies have often defined the term operationally, depending on the focus of inquiry, the population of interest and the drug categories being investigated.

Terms such as 'drug-abuse related' and 'drug-induced' have been used to describe DRDs. The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA: 2000) has referred to two forms of DRD. Firstly, DRD can refer to deaths directly linked to an acute adverse reaction, i.e. overdose. It can also refer to deaths indirectly associated with drug abuse e.g., suicide, and deaths from natural causes resulting from prolonged drug abuse, AIDS, hepatitis C, etc.

In the US, the Drug Abuse Warning Network (DAWN: US Department of Health and Human Services, 2000) has a somewhat different perspective where the all-inclusive term is *drug-abuse death*. This term refers to death resulting from a drug used for psychic effect, dependence, or suicide, and it encompasses two other categories – drug-induced and drug-related deaths. A *drug-induced* death is one where the death was caused by a specific drug, through overdose. A *drug-related* death is one where the medical examiner was convinced that a specific drug was implicated but was not the sole cause (US Department of Health and Human Services, 2000). Various chapters in this volume present different criteria for defining a drug-related death, thus reiterating the difficulty in adhering to a standard definition across national boundaries.

The World Health Organisation (WHO 1993) acknowledged the variation in the definition of drug-related mortality and the difficulty this presents in conducting international comparisons. In some European countries, for instance, the reporting system covers only overdose on controlled drugs while others cover other categories of licit psychoactive drugs, with or without alcohol.

Consequently, the WHO (1993) recommended that the term 'drug abuse-related death', should be used in place of 'drug related death' or 'drug abuse death'. The WHO then defined drug abuse related death as 'fatal consequences of the abuse (nonmedical use, misuse) of internationally controlled substances and/or of nonmedical use of other substances for psychic effects' (p. 7). This definition includes the following categories of death:

- Acute intoxication or poisoning
- Polysubstance abuse and influence of adulterants/additives
- Poisoning due to accidental exposure
- Chronic intoxication
- Suicides
- Drug abuse-related accidents
- Drug abuse –related diseases

The WHO categories outlined above are used to explore different forms of drug-related deaths.

Acute intoxication or poisoning ('overdose')

This category of deaths accounts for a large proportion of drug-related mortality. For instance, the majority of deaths (68%) in United Kingdom (UK) addicts over a 27-year period (1967-1993) fall into this category, with opioids of one kind or another accounting for about 65% of these deaths (Ghodse *et al* 1998). In 1999, acute intoxication accounted for 91% of deaths among drug abusers in England and Wales (Ghodse *et al* 2000). Similarly in Austria 92% of deaths in 431 addicts between 1995 and 1997 resulted from acute intoxication (Risser *et al* 2000). Acute intoxication also accounted for the majority of deaths in Denmark (75%), Norway (80%) and Sweden (53%) (Wethe 1998). Some of the main reasons for the large number of overdose deaths generally include:

- Reduction in tolerance after periods of voluntary or enforced abstinence
- Sharp fluctuation in drug purity

Polysubstance abuse and influence of adulterants/additives

The majority of opioid addicts are known to use other substances in combination. Many drug-related deaths, therefore, involve other drugs with or without alcohol. In a study of 1413 drug-related deaths in England and Wales, ratios of combination drugs fatality were as follows: heroin/morphine (32.5%); methadone (11%); other opiates/opioid analgesics (17%); cocaine (3.8%); amphetamines (2.8%) and alcohol (20.2%) (Ghodse *et al* 2000). The largest proportions of drug fatality are due to combined effects of opioids/opiates with other drugs. The major drugs known to interact with opioids in a synergistic fashion are alcohol and benzodiazepines. Although weak respiratory depressants (Van de Borne *et al* 1997) alcohol and benzodiazepines are known to potentiate acute intoxication due to opioids (White and Irvine 1999).

Poisoning due to accidental exposure

Deaths in this category include those involving drug 'mules' or 'body packers', and the result from the rupture of drug packages inside the abdomen. Deaths in this category are closely linked with smuggling of illicit drugs. Body packers are also known to reingest the content of excreted drug packages for the purpose of suicide (Stickenwirth *et al* 2000). Increasing number of cases of 'body packing' have been reported in Europe where body packers have died of cocaine intoxication after the rupture of the package in the gastrointestinal tract (Anders *et al* 2000).

A proportion of street drugs, especially heroin, are made up of adulterants, contaminants and diluents. Some of these additives may be pharmacologically active, and can cause toxic side effects. Common pharmacologically active additives include scopolamine (Hamilton *et al* 2000) dextromethorphan and quinine. Other drugs include lidocaine, caffeine, strychnine and procaine.

In a study of heroin-adulterated poisoning in the US, scopolamine was observed to be responsible for a large proportion of emergency room admissions, with 55% of the cases presenting with signs and symptoms of heroin toxicity, accompanied by anticholinergic symptoms (Hamilton *et al* 2000) characteristic of scopolamine toxicity – dilated pupils, flushing, dry and warm skin, tachycardia and altered mental state (Dillman 1997). In a German study of 49 drug-related deaths, Sporket and Pragst (2000) identified 32 cases with substantial lidocaine concentrations. Their findings also revealed that lidocaine consumption was prolonged, suggesting that it served as an adulterant of cocaine and heroin preparations.

Dextromethorphan and quinine have also been implicated in drug-related deaths. Dextromethorphan is known to produce PCP-like toxicity while the hypotensive effects and thrombosis-causing properties of quinine make it a lethal substance, especially when administered or consumed with heroin (Dillman 1997).

Cases of DRD among children resulting from neglect have been reported. Children of drug abusing parents are more likely to be at risk of this type of death, often through accidental ingestion of drugs. Surveillance of unintentional poisoning among children less than 15 years old in the United States recorded a rate of 0.3 deaths/100,000 persons in 1986. About 37% of those deaths were drug-related (CDC 1989). The trend in Europe is not as clearly defined.

Chronic intoxication

Chronic intoxication is often associated with prolonged harmful use of drugs. In general, addicts die at a rate that is often much higher than that of the general population. A lifestyle of addiction predisposes the addicts' population to premature mortality as a consequence of generally poor health status. Comparing mortality in a defined population of UK addicts to that of the general population, Ghodse *et al*'s (1998) study of 92,802 addicts revealed that mortality among addicts was about 7 times that of the general population, with a median age at death of 31 years. Mortality among UK teenage addicts was about 15 times that of the general population of the same age (Oyefeso *et al* 1999b).

Suicides

Suicide in the general population has been described as the eighth leading cause of death in all age groups (Buzan and Weissberg 1992) and the third most important contributor to years of life lost (Gunnell and Frankel 1994). In a study of successive cohorts of 69,880 addicts in the UK, Oyefeso *et al* (1999a) reported an annual suicide rate of 62.9% per 100,000 person-years (excluding undetermined deaths). Overdose accounted for the largest proportion (45%) of suicides. Methadone and antidepressants were the drugs most frequently implicated in suicide. Altogether, suicide was 6 times as likely to occur among addicts than in the general population.

Drug abuse-related accidents

In some cases accidental deaths can occur during intoxication. This category of deaths is linked with road traffic accidents or accidents at work. Drug abuse-related accidents resulting in death also occur in other forms. Ghodse *et al* (2000) have observed that about 1% of drug-related deaths in the UK were as a result of asphyxiation, accidental drowning and multiple injuries.

Drug abuse-related diseases

Perhaps the most commonly associated condition with premature mortality among drug-addicts is HIV/AIDS. Many AIDS-related deaths among addicts have been reported across Europe. In Switzerland the number of AIDS related deaths among addicts increased from 5 in 1985 to 292 in 1994 (Blätter 1998). In Catalonia (Spain), Orti *et al* (1996) reported an increase in DRD from 13.8/1000 per year in 1985 to 34.8/1000 per year in 1991, and this included a large number of AIDS-related cases. In the Netherlands, about 40% of DRD cases of HIV-positive injecting drug users were diagnosed with AIDS (van Haastrecht *et al* 1996). Yet the majority of HIV-positive addicts died from causes other than AIDS (Eskid *et al* 1993).

There are recent reports of deaths due to acute infection among injecting drug users. Cases of acute severe illness resulting in death were reported in Scotland, Ireland and England between April and August 2000, together with one in Norway. These deaths were linked to bacterial infection involving *Group A streptococcus, Staphylococcus aureus, Clostridium* and *Bacillus* species. The condition resulting in death was characterised by extensive local inflammation at injection sites, followed by hypotension and circulatory collapse (CDC 2000). Further investigation of some of these cases revealed an alarming trend in wound infection among injecting drug users, by *Clostridium botulinum* and *Clostridium novyi* (PHLS 2000).

Coroners' verdicts

In addition to the different categories described earlier, there are other classification systems for DRDs. In England and Wales, for instance, the coroners make decisions on death classification based on evidence gathered at inquest, from various sources – pathologists, police, clinicians, etc. Such investigations are carried out when a death occurs in suspicious circumstances. In cases of a drug-related death, the coroner has a choice of six verdicts – dependence on drugs, nondependent abuse of drugs, accident/misadventure, suicide, open/undetermined and homicide.

ICD classification

Major attempts to standardise DRD statistics have relied on the International Classification Diseases (ICD) taxonomy, which is now in its tenth revision (ICD-10: WHO 1992). The ICD taxonomy relies largely on the information provided on death certificates. ICD-10 death codes that refer to DRD include X40-X47 (accidental poisoning) and X60-X67 (intentional self-poisoning).

Death Certificates

Most of the information about death comes from death certificates in which deaths are coded, by international agreement, according to an underlying cause. An underlying cause of death has been described as the condition that initiated the series of unwholesome events that led directly or indirectly to death or the circumstances of the accident that produced the fatal injury (National Center for Health Statistics 1983). For instance, a death can be coded on the certificate as cerebral anoxia, yet the underlying cause could be accidental poisoning by and exposure to narcotics (heroin, morphine, etc.).

Quantitative dimensions of DRD

Drug-related mortality can be expressed in quantitative forms using rates and ratios.

Mortality rates and ratios: The most commonly mentioned rate is the annual death rate (ADR) where all drugs were implicated (per 1000 population).

$$\text{ADR} = \frac{\textit{Total number of all DRDs in 1 year}}{\textit{Number of persons in the population of interest at mid-year}}$$

Given the continuous change in population estimates, the mid-year population is generally regarded as a useful approximation.

In calculating annual rates, however, the population of interest must be clearly defined. This could be the general population, e.g., registered addicts or addicts in treatment systems.

Specific rates can also be calculated for certain age groups (age-specific) and by gender (gender-specific). Rates can also be specified by main drug problem, e.g., opiate-related problems. Such rates are often referred to as cause-specific. An opiate-related mortality rate can be calculated as follows:

Annual death rate from opiate abuse

$$= \frac{\textit{Number of deaths where opiate drugs were implicated}}{\textit{Number of persons in the population of interest at mid-year}}$$

Another commonly used rate, in place of annual death rates is cause-fatality rate (CFR) calculated as:

$$\frac{\textit{Number of addicts dying during a specified period after first diagnosis}}{\textit{Total number of addicts in the population}}$$

Cause fatality reveals the percentage of diagnosed addicts that die within a certain time after diagnosis, of natural or non-natural causes.

Proportionate mortality: Quite often, the denominator, i.e., the defined population, for calculating at DRD rate is difficult to establish or quantify. Consequently, in many cases, a proportion due to specific drugs can only be calculated. For instance, proportional mortality, also referred to as the prevalence ratio (PR), due to opiates in 1 year (%) can be calculated as:

$$\frac{\textit{Number of deaths where opiates were implicated}}{\textit{Total number of DRDs in that year}}$$

Although there may be an increase in the proportionate mortality due to opiates in certain age group or gender, this does not really indicate that the risk of death from opiates is also increasing.

Another variation of proportionate mortality is the *proportionate fatality index* (PFI). This is the ratio of observed and internally adjusted expected fatality due to a drug class, multiplied by 100. Oyefeso *et al* (2000) calculated the PFI for different classes of antidepressants of different classes accounted for the highest PFI in the DRD sample studied.

Years of potential life lost (YPLL)

This is a mortality index that quantifies the loss of future productive years in an addict that dies at a younger age. For instance, surveillance of mortality in the United States in 1989 and 1990 revealed that HIV infection ranked 11th by cause-specific mortality, but 7th by YPLL (CDC 1990). The discrepancy in the two ranks suggests that a large proportion of HIV-related deaths occurred in younger persons (Gordis 1996).

Population comparisons of DRD

One of the values of collecting DRD data is to enable comparisons between different populations within and across geographical boundaries. The WHO and the EMCDDA conduct such studies periodically. However, because populations can differ in respect of many characteristics that influence DRD, such as age distribution, gender distribution, drug availability, service provision, etc., there is a need to hold the effects of these characteristics constant during comparisons.

The most commonly adjusted characteristic is age distribution. Ghodse *et al* (1998) have used the method of age adjustment to compare mortality rates of different cohorts of addicts. These rates are then termed age-adjusted rates.

Another method of adjustment is to calculate the standardised mortality ratio (SMR). This is calculated as:

$$\frac{\text{Observed number of DRDs per year}}{\text{Expected number of DRDs per year}} \times 100$$

Obtaining the expected number of DRDs involves multiplying the age-specific DRD rate in the general population (or a standard population) by the estimate of the population of interest. Ghodse *et al* (1998) have demonstrated the usefulness of SMRs in evaluating differences in excess risk of premature mortality between different cohorts of opiate addicts.

Sources of inaccuracies in DRD quantification

Death Certificates

There are concerns that inaccurate reports on death certificates often result in error in death classification. Feinstein (1985) has highlighted problems related to using ICD codes, some of which result from the over-reliance on death certificates. They include the following:

- Absence of standard criteria for clinically deciding which of the several diagnoses is the actual cause of death
- Insufficient recognition of the impact of changes in the modality and precision of diagnostic technology
- Lack of, or insufficient, guidelines to doctors in preparing death certificates
- Low frequency of absence of postmortem confirmation of cause of death

These problems, however, are not peculiar to DRD data.

Administration

Another source of errors is the administrative process involved in death notification and compilation of DRD statistics. The following administrative lapses are known to result in such errors:

- Missing information on the deceased (e.g. age; cause of death)
- Errors in transferring information from death certificates
- Error in the classification of the underlying cause of death and in coding in accordance with the ICD taxonomy (Alderson 1981)
- Missing information on the substance(s) implicated in death

Socio-cultural Factors

There are religious values in many countries that do not permit the conduct of autopsy. For instance, Orthodox Judaism demands burial before sunset on the day of death, with the body remaining undisturbed by dissection (Hill and Anderson 1988). Many Muslim sects also engage in a similar practice. Consequently, both main and underlying causes of death are left unrecorded, resulting in under-reporting. The deceased family's refusal of an autopsy can also result in under-reporting.

Conclusion

The sources of errors described in this chapter have implications for comparing DRD transnationally, especially in Europe, given the variation in administrative and socio-cultural practices. Altogether, two main sources of error in mortality trends are those relating to numerator and denominator, respectively. Numerator errors include:

- Diagnostic inaccuracies
- Error in age classification
- Changes in coding rules (e.g. change from ICD-9 to ICD-10)
- Changes in death classification
- Emergence of new drugs of abuse
- Emergence of new drug abuse-related conditions (e.g. hepatitis C)

Denominator errors include:

- Errors in quantifying the population at risk
- Errors in demographic distribution

In this chapter, we have examined the qualitative and quantitative dimensions of DRD and associated problems. The remaining chapters in this volume (i) further explore some of these problems, (ii) provide modalities for minimising the errors inherent in DRD statistics, (iii) describe innovative techniques for DRD definition and data collection procedures, and (iv) demonstrate the utility of DRD statistics in developing and evaluating policy and treatment effectiveness.

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Chapter 2 Establishing a specialist register of drug related deaths in the UK

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Introduction

Data on drug-related deaths are known to be useful epidemiological indicators of the harmful effects of drugs, prevalence and severity of drug use. Their usefulness in evaluating the outcome of drug control and treatment policies and practices has been demonstrated (Ghodse *et al* 1998). Whilst it is recognised that there are many problems related to the collection of such data not least of which is possible under-reporting (Ghodse *et al* 1998; van Laar and de Zwart 1998; Alderson 1981), the utility value of such a data system is only beginning to be acknowledged (ACMD 2000).

The National Programme on Substance Abuse Deaths (np-SAD) based at the Centre for Addiction Studies, St George's Hospital Medical School, London, maintains a specialist register (SR) of deaths of addicts that were notified, by law, to the UK Home Office, and listed on the Addicts Index. The majority of those notified were opioid addicts. This register provides information on trends and patterns of mortality among successive cohorts of addicts (Ghodse *et al* 1985, 1998). Sources of the SR data include death certificates, coroners' reports, death notifications from the National Health Service Central Register (part of the Office for National Statistics) and the General Register Offices for Scotland and Northern Ireland.

In 1998, the Programme expanded the coverage of the SR to include all deaths in the general population where at least one psychoactive drug was implicated. The expansion coincided with the introduction of the Government's ten-year Drugs Strategy, which has the reduction of drug-related deaths as one of its performance indicators.

One of the aims of np-SAD was to provide national drug-related death surveillance through the SR, and routinely inform clinicians and policy makers on risks associated with premature death due to substance misuse. These are functions that are not currently performed by the General Mortality Registers managed by the Office for National Statistics, and the General Register Offices in Scotland and Northern Ireland.

This chapter sets out the key components of np-SAD's surveillance and how these translate to prevention of drug-related deaths. The chapter also explores factors that affect the validity of drug-related death (DRD) surveillance in the UK and provides an overview of how a specialist register can assist both clinicians and policy makers in preventing drug-related deaths.

What is surveillance?

Health-related surveillance has been described as the 'ongoing systematic collection, analysis, and interpretation of outcome-specific health data, closely integrated with the timely dissemination of these data to those responsible for preventing and controlling disease or injury' (Thacker and Stroup 1998:106). The use of surveillance data can be arranged under the following headings: time, place, and person.

Collecting information over time offers the opportunity to

- Detect immediate changes e.g. newly emerging drugs responsible for overdose
- Disseminate findings, bi-annually/annually to facilitate research priority-setting, and estimate magnitude of problem
- Maintain archival information for noting the pattern of drug-related deaths over time and correlating this with government and local policies/ national clinical practices to evaluate effectiveness

Monitoring geographical location of a reported incident is of equal value. This is particularly important where health and social care is sectorised and local policies and practices are distinct. Although it is accepted that a higher prevalence of drug-related deaths is associated with large metropolitan areas, knowledge about the pattern of drug-related deaths in rural setting and how they compare across geographical locations could yield significant information for local planners with responsibility for drug service provision. For example, DRD surveillance may indicate an excess of amphetamine-related deaths in a rural geographical area that does not have provision to address amphetamine abuse within its current clinical services.

Information on the 'person' in terms of their characteristics e.g. gender, ethnicity, history of known substance misuse, prescription history, etc, can assist in the development of risk profiles. This can ultimately facilitate targeting efforts with specific groups.

Barriers to DRD surveillance in the UK

Drug misuse, and associated health, social and economic consequences, is a dynamic problem. Experience to date has shown that the problem is increasing, the nature of use is changing and new and different types of substances and ways of using them continue to challenge those with responsibility to implement policy and provide treatment. In reality, the speed of change can be enormous and it is not unusual for drug use patterns to change rapidly. Consequently, the usefulness of DRD surveillance is determined by the provision of prompt and user-friendly information to policy makers and practitioners (Terris 1992).

Prior to the establishment of the 'special register' by the Centre for Addiction Studies, the main source of information on drug-related deaths in England and Wales was the Office for National Statistics (ONS). Data from this source can take up to two years to be disseminated. This delay in information provision limited the usefulness of such data for surveillance and, therefore, for informing prevention and treatment policies and practices.

Other problems with the GMR have been highlighted. These include:

- Lack of consensus on definition of a drug-related death – death due to drugs can be immediate (e.g. overdose) or prolonged (e.g. liver cancer); direct (taking of a substance) or indirect (road traffic accident due to intoxication).
- Under-reporting – factors which contribute are: the illicit nature of substance use, lack of training in recognition of the problem, lack of resources and expertise in systematic data collection.
- Overlap and ambiguity in some verdicts returned by the coroner, especially 'dependence on drugs' and 'nondependent abuse of drugs.'
- Incomplete information on specific drugs implicated in death. For example, where a number of drugs are mentioned on a death certificate, the drug that is deemed to have made a major contribution to the death is not often specified.
- Whilst recognising that coding experts (e.g. ONS) are to a large extent dependent on the quality of the information recorded on the death certificate, there are limitations within the coding frame itself (i.e. ICD-9), which need to be addressed (ACMD 2000).

It should be noted that the issues raised are not peculiar to the UK. A feasibility study, commissioned by the EMCDDA 1999) on implementing standards for collecting data on drug-related deaths in EU Member States, made similar observations. It has been recognised for some time that the quality of DRD data can be affected by many factors, ranging from the investigation of the death-scene to the classification of cases in official statistics (Shia 1994). Other sources of errors have been described in Chapter One.

The development and maintenance of a specialist register of Drug Related Deaths

Consultation phase: The National Programme on Substance Abuse Deaths, although only formally named in 1997, had been conducting research in the area of drug-related mortality since the early 1970s (Ghodse *et al* 1978, 1985, 1998), with an established specialist register of deaths of notified drug addicts dating from 1967. In 1997, the Addicts Index was discontinued and the requirement for coroners to notify deaths to the Home Office was, therefore, abrogated. A meeting was held between the staff of np-SAD and the Home Office to discuss continuity of death reporting by coroners to the specialist register at the Centre for Addiction Studies, on a voluntary basis. The discussions were positive and the Home Office asked the coroners to make voluntary returns to the specialist register.

With the opportunity afforded by this change in the route of reporting, a review of the existing SR was conducted. The review involved the type of information which had been collected to date, how this may be improved, and more importantly how the information could be entered, analysed and disseminated quickly, in order to enhance the surveillance function of the SR.

The development of the surveillance component of the expanded SR included the following elements:
The objectives of the SR were to:

- Establishment of goals/purposes
- Development of case definitions
- Selection of appropriate personnel
- Acquisition of tools and clearances for collection, analysis, and dissemination
- Implementation of the surveillance system
- Evaluation of surveillance activities (Thacker and Stroup 1998)

Establishment of goal/purpose

The objectives of the SR were to:

- Collect and collate data on psychoactive substance-related mortality
- Examine trends in these data
- Provide relevant commentary on the prevention of substance-related deaths whether caused accidentally or intentionally from data analysis
- Ensure that dissemination of such information was concise and prompt

Case definition

One of the main challenges is determining what is meant by a drug-related death. Clear and simple case definitions are deemed to be essential, and must also be practical and quantifiable. For the purposes of the SR the following case definition was adopted and circulated to all participating coroners. A 'case' is defined if any of the following criteria are met at inquest or fatal accident inquiry

- One or more psychoactive substance directly implicated in death
- History of dependence or abuse of psychoactive drugs, or
- Presence of Controlled Drugs at postmortem

A footnote further defines what is a 'psychoactive substance' and what are 'Controlled Drugs'. Coroners are advised to report on alcohol only when implicated in combination with other psychoactive drugs.

Another subgroup of cases are those termed 'drug abusers/dependants'. A drug abuser/dependent case is defined as one with a history of substance abuse where one or more of the following criteria are met:

- Reported as a known illicit drug user by the coroner, based on evidence obtained at inquest
- Prescribed substitute medication (e.g., methadone) for drug dependence
- Presence of an illicit drug at postmortem, where not prescribed, or
- Presence of any additional information on the coroner's report suggestive of a history of drug abuse, and where such a history fulfils ICD-10 criteria

Appropriate personnel

One of the key benefits of establishing the SR was the opportunity to select appropriate personnel. By siting the SR within an academic/clinical department of addictive behaviour, access to key individuals with extensive epidemiological, clinical and policy experience provided added value to the programme, especially in the areas of data validation and interpretation and application of findings. Making 'sense' of the findings and putting this into language that could be understood by both policy makers and clinicians in the field, was deemed to be a very practical gain of establishing an SR.

Acquisition of tools, and clearance for collection, analysis and dissemination

Prior to implementing the SR meetings were held with Home Office officials and coroners to standardise and expand the data set, which would not only ensure consistency across all reporting jurisdictions, but also allow for more accurate comparisons. It was agreed to collect information under six main areas: *demographics* (age, sex, ethnicity, occupational status, living arrangements); *circumstances of death* (place of death, whether deceased was receiving prescribed medication, or had a known history of substance misuse, drugs found at postmortem); *causes of death* (including coroner's verdict*); any other relevant information*; and *coroner's details*. The questionnaire was structured in a brief format in order to ensure compliance from the coroners.

The dataset is held on a Microsoft Access database, anonymised and then transferred to SPSS (a statistical package for social science) for further analyses. Given the sensitive nature of the information held, access to the database is limited to np-SAD designated staff, with security checks in place. A great deal of consideration was given to the area of coding to ensure that comparison with other databases (e.g. Office for National Statistics) was possible and that the final analyses would be readily accessible to the relevant audience. For example cases can be described according to:

- Health Authority/Drug Action Team area of residence
- Causes of death (immediate and underlying) were recoded according to ICD-10
- Drug type (i.e. prescribed, found at postmortem and/or reported as implicated in the death) was coded separately and according to therapeutic drug category (i.e. hypnotics/sedatives, antidepressants, opiates, etc)

To ensure completeness of the dataset, key information on certain data (e.g. verdict, underlying cause of death) must be entered before the case can be registered onto the database, thus ensuring that 'missing data' are picked up immediately. In such cases, the coroner's office is contacted and asked to provide the missing data, where available or update other relevant information.

Implementation

After completing the 'setting up process', the next stage was to implement the new system. This to some extent proved the greatest challenge for a number of reasons; lack of central funding; participation was voluntary and the potential lack of interest among the coroners in the subject matter. Considerable effort was made to ensure that each coroner was contacted and the purpose of the SR and the intention to make the data accessible explained. One of the key aspects of the SR was ensuring that all coroners received prompt feedback on DRD patterns; hence the publication of a six-monthly surveillance report was introduced.

The surveillance report covered all data received in the previous 6-month period. The contents of the report fall into four main sections: *profile of cases* (demographics, drug-related death rates by reporting jurisdiction; death location; underlying causes; prescribed psychoactive medication implicated and substances implicated); *associated risks* (sex and accidental/intentional death; age and accidental/intentional death; prescribed psychoactive drugs; methadone; antidepressants; other opioid analgesics and hypnotics/sedatives); *drug abuse* (cases with a history of illicit drug use are compared to those without) and finally a *commentary.* The latter highlights the main findings and discusses implications for clinical practice and policy development at the local, regional and national levels.

Initial response was slow, some coroners interpreted the initiative as 'another research exercise', and others spoke about the lack of resources available to complete the forms. In the first six-month reporting period 35 coroners from a total of 137 participated. This increased to 80 in the second period and 96 in the third period. At the time of the 7th period (October 2001), about 90% of coroners' offices in England and Wales have participated in the SR.

The SR has been developed to accommodate the difference in the reporting systems adopted in Scotland and Northern Ireland. Discussions with the General Register Office (GRO) Scotland are positive and there are plans to include DRDs from Scotland in the SR. Similar arrangements are being made with the GRO Northern Ireland.

Evaluation

A final element in a surveillance system is evaluation. The programme regularly receives feedback from those providing and using the information. Efforts have been made to establish good communication links with coroners' offices. This facilitates early identification of problems, which can be addressed without disruption to the system. Regular feedback on an informal basis is received from politicians, policy makers, health planners and clinicians using

the reports, and this permits the programme to update the format of its reports in response to audience needs. Some of the proposed changes arising from feedback include (i) change in ethnicity categories in line with the 2001 population census classification; (ii) request of toxicological reports from coroners in order to examine the quantity of drug metabolites identified from blood or tissue samples.

Impact of Special Register to date

As the coverage of reporting increases so too does the identification of trends locally, regionally and nationally, with the capability of making comparisons across jurisdictions. The aggregated data presented in the six-monthly summary reports supports the surveillance utility of the SR. For example a coastal town in the south east of England, which was identified in the first report as having the highest semi-annual death rate per 100,000 population, continues to remain high in subsequent reports. As this area differs markedly from neighbouring jurisdictions, and similar coastal resorts, the report recommended that local response should be initiated to tackle this unique phenomenon. Consequently, a local confidential enquiry was conducted and this in turn led to a review of prescribing and dispensing practices in local services.

The surveillance reports have also revealed strong correlations between prescribing practices and drugs implicated in death. For instance prescribed antidepressants are implicated in death mainly because many of the cases were prescribed, and consumed, a combination of two or more classes of antidepressants. The reports have also highlighted the need for rational prescribing among general practitioners, given that a large number of deaths occur from the prescription of opioid analgesics.

The programme responds to request from Health Authorities, Drug Action Teams and similar agencies that wish to have a more detailed breakdown for their own geographical area. These requests are prompted as part of the agencies' needs to prevent drug-related deaths within their catchment area by providing services that are responsive to local needs. The surveillance data requested offers these agencies the opportunity to identify modifiable risk factors and assists them in formulating locally-sensitive policies.

Benefits offered by a Special Register

While recognising the utility of statistics provided by GMRs, the need for additional datasets by specialist registers has been demonstrated by the National Programme on Substance Abuse Deaths. The benefits offered by a specialist register can be summarised as follows:

- Provision of DRD data that are specific local drug policies and practices
- Utilisation of data collection procedures that allow for additional information to be collected, that cannot be provided on death certificates

- Availability of staff with expertise in the field of drug addiction, thus providing more informed commentary on the interpretation and implication of findings for clinical practice
- Immediate access to new information that can feed quickly into prevention initiatives
- The publication of six-monthly surveillance reports that provide indication of the extent of drug-related deaths, thus assisting policy makers to modify priorities and redirect intervention initiatives that are sensitive to current patterns
- Ability to identify cases of drug-related deaths with a history of drug abuse/dependence enables the development of evidence-based prevention programmes for this vulnerable group
- Retention of data in a readily accessible electronic format to facilitate understanding further studies of predictors, trends and patterns of drug-related deaths

In September 2000, np-SAD published an annual review of information received from coroners in England and Wales resulting from drug-related deaths that occurred in 1999. There were 1413 notified cases. The findings of the review are as follows:

- The majority of cases (76%) died from accidental poisoning, with higher male representation. About 83% of cases under the age of 45 years died of accidental poisoning.

- About 62% of cases had a history of drug abuse/dependence, and on average the age at death of drug abuser/dependent cases was 16 years younger than those without such a history

- The five highest coroner's jurisdiction-specific DRD rates range between 24.1 cases/100,000 and 10.8/100,000

- Opiate/opioid drugs either alone or in combination accounted for 43% of deaths where specific drugs were mentioned

- Methadone was implicated in 11% of cases; these deaths were more likely to be a result of illicit use rather than prescribed medication

- About 54% of all cases were receiving prescribed psychoactive medication at the time of death; and about 60% of those receiving prescribed drugs had their medication implicated in death

- Opiate/opioid drugs were the main drugs implicated in cases aged 55 years and over

Conclusion

Establishing a specialist register should be considered as a major element of a response framework in the reduction of drug-related deaths. A study commissioned by the EMCDDA in 1998, which explored the feasibility of improving the quality and comparability of data on drug-related deaths across EU member states, found that countries which had two data sources on drug-related deaths, (i.e. National Statistics on causes of deaths, and/or from specialist registers), reported that the specialist register was the most reliable and comprehensive source (van Laar and de Zwart 1998).

Whilst acknowledging the many difficulties inherent in setting up DRD data capturing systems, the experience of setting up, and the subsequent utility of the example of a special register in the UK, supports the opinion that SRs are essential supplements to GMRs. The key elements of specialist registers that make them useful surveillance tools are the speed of data being made available, and their accessibility to relevant policy makers and clinicians.

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Part II

Perspectives across Europe

Chapter 3 Drug-related mortality in Belgium

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Summary

This chapter describes the Belgian situation regarding data collection about drug-related deaths. Several decisional levels co-exist in Belgium: federal, regional and linguistic community, which leads to many pitfalls in data collection and centralisation. In Belgium there is a limited number of reliable studies of opiate addiction prevalence. This prevalence rate is generally estimated to be around 0.4%.

Current drug-related information is available only for the years 1986 to 1994. The results presented in this chapter gather recorded data from the General Mortality Register using the EMCDDA coding system: Drug-Related Deaths Standard 1.0. (see Appendix).

Annual variations in the different fields presented in this data analysis reflect more a death certificate completion problem rather than real changes in drug-related deaths.

In conclusion, efforts made by the drug-related deaths special taskforce aiming at better co-ordination, communication and data centralisation at each decisional level, and to better medical practitioners training will certainly lead to significant improvement in the reliability of data in the next few years.

Ce chapitre décrit la situation belge quant au recueil d'informations concernant la mortalité liée à la prise de toxiques. Différents niveaux de pouvoir coexistent en Belgique : fédéral, régional et communautaire, constituant autant d'écueils dans la récolte et la centralisation des données. En Belgique peu d'études fiables permettent d'évaluer la prévalence des toxicomanies aux opiacés. Cette dernière est généralement évaluée à plus ou moins 0.4%.

Les informations actuelles sur les décès liés à la prise de toxiques ne sont disponibles que pour les années 1986 à 1994. Les résultats présentés dans ce chapitre rassemblent les données enregistrées dans le registre général de mortalité, utilisant le système de codage de l'EMCDDA : Drug-Related Deaths Standard 1.0. (Voyez Appendix).

Les variations annuelles dans les différents champs présentés dans cette analyse de données reflètent plutôt un problème de complétion des certificats de décès qu'une réelle modification dans les décès liés à la prise de toxiques.

En conclusion, les efforts engagés par le groupe de travail sur les décès liés aux prises de toxiques afin d'obtenir une meilleure coordination, communication et centralisation des données à chaque niveau de décision

ainsi qu' une meilleure formation des médecins quant à la complétion des certificats de décès montreront certainement leurs effets dans les années à venir.

Introduction

Belgium is a small country bordered by the North Sea, France, the Netherlands, Germany and Luxemburg. The surface of Belgium is 30,528 km² and the population density is about 333 inhabitants per km². In January 1999, the Belgian population comprised 10,213,752 inhabitants with 954,460 inhabitants in the Brussels-Capital region, 5,929,838 inhabitants in the Flanders region and 3,332,454 inhabitants in the Walloon region. For the years 1997 and 1998, the mean population increase (which results from natural increase and a positive immigration balance) was respectively 2.1% and 2.2% whereas the mortality rates were 1.03% and 1.02%.

The Kingdom of Belgium has been a federal state since 1993, comprising three administrative regions: Flanders, Wallonia and Brussels-Capital. Moreover, Belgium is also divided in three language-based Communities: Flemish, French and German. Regions and Communities do not share the same territories: i.e., the German Community belongs to the Walloon Region and the Brussels-Capital Region is part of both the Flemish and French Communities. Each region and community has its own government. Health policy is shared by the three decisional entities (federal, regional and community). Eight Health Ministers are involved in health problems related to drugs. A full description of the Belgian complexity regarding drugs-related policy can be found in the last Belgian national report on drugs 1998 (BIRN 1999).

The co-ordination of epidemiological data collection is currently organised by the Belgian Focal Point or BIRN. The Belgian focal point is the Belgian representative in the REITOX (Réseau Européen d'Information sur les drogues et les Toxicomanies / European Information Network linking the EMCDDA and the National Focal Points for the exchange of information on drugs and drug addictions) which is an European network designed by the EMCDDA. The BIRN (Belgian Information Reitox Network) was created in 1995 and links the National Focal Point with the four pre-existing Sub-Focal Points: ASL (Arbeitgemeinschaft für Suchtvorbeugung und Lebensbewältigung / Work group for addiction prevention and life mastering) for the German Community, CCAD (Comité de Concertation sur l'Alcool et les autres Drogues / Consultation Committee on Alcohol and the other Drugs) for the French Community, CTB-ODB (Concertation Toxicomanies Bruxelles - Overleg Druggebruik Brussel / Consultation on Drug Addiction Brussels) for the Brussels-Capital Region, VAD (Vereniging voor Alcohol en andere Drug problemen / Committee for Alcohol and other Drug problems) for the Flemish Community. The Focal and Sub-Focal Points get in touch with many partners from different fields (justice, police, toxicological laboratories, universities and other research centres, prevention and harm reduction organisations,

therapeutic communities and other treatment services), exchanging information, collecting and analysing data and disseminating results.

Drug use prevalence rates

In Belgium there are no reliable data on drug addiction prevalence rates. However, some indicators could be used with caution.

In the latest EMCDDA report on comparable national estimates of problem drug use prevalence in Europe (EMCDDA 1999), the authors pointed out that the only reliable estimate in Belgium was based on the HIV/AIDS register. Using a back calculation method, the estimated prevalence rate for the 15-54 year age range was 0.36%. The Belgian report also highlighted the efforts made to improve the situation over the next few years (Walkiers *et al* 1999).

Nevertheless, two studies of the general population in two Belgian provinces: Liège (Reggers *et al* 2000a) and Luxemburg (Reggers *et al* 2000b), *not specifically designed for this purpose*, gave information on under-rated lifetime prevalence rates of DSM-IV heroin dependence. The objective of these studies was threefold. The first aim was to study the feasibility of a wide psycho-epidemiological investigation of the general population in Belgium using highly-structured diagnostic instruments. The second goal was to estimate the prevalence of psychiatric disorders in a provincial non-institutionalised community sample. The third goal was to note the various professional treatments received in cases of potential psychiatric disorder. Two different sampling strategies were used regarding the geographical structure of the provinces, the time devoted to the data collection and the available funding.

In the province of Liège, a mostly urban province in the east of the country, a probability cluster sample stratified by gender, age (15 to 85 years and over) and residential municipality was drawn by the National Institute for Statistics (NIS/INS) from the Belgian Population National Register Database. The method was based on a mailed questionnaire sent by the NIS to a wide target sample (n = 20,000). People would mail back their written agreement to participate. The 1,100 first responses were used for the sample survey. By comparison, in the province of Luxemburg, a rural province in the south of Belgium, a probability cluster sample stratified by gender, age (18 to 54 years) and residential municipality was drawn from the Population Register Database of 3 representative cities in the province. After a mailed questionnaire, interviewers went directly to subjects' homes to negotiate an appointment. In both surveys, the respondents were interviewed face to face at home by interviewers who all went through a 5-day study-specific training programme and who were given weekly supervision. Psychiatric disorders were assessed by a modified version of the CIDI 2.1 (French version of the Composite International Diagnostic Interview, WHO 1997). Data on any professional treatment received by subjects who showed potential psychiatric disorders were collected. In the province of Liège, with a sample size of 1,040 subjects,

lifetime prevalence rate of DSM-IV opioid dependence was 0.3% whereas DSM-IV opioid abuse disorder was 0.6%. In the province of Luxemburg, with a sample size of 807 subjects, lifetime prevalence rate of DSM-IV opioid dependence was 0.2%, DSM-IV opioid abuse disorder was also 0.2%.

Another recent study (Ledoux *et al* 1999), based on the capture-recapture method (using Darroch correction), estimated the opiate user prevalence rates in the French Community for the 1993-1994 period. This study focused on a population of patients using treatment centres participating in the Pompidou Protocol CCAD study on the 'First demand and treatment demand' indicators. This monitoring system covered about 80% of treatment centres in the French Community. Despite numerous biases, prevalence rates of opiate drug user in the age range of 15-50 years were estimated to be 0.7% for the French Community and 0.37% for the whole country.

In conclusion, epidemiological information remains incomplete, a *national* monitoring system is lacking and efforts must be made to organise and harmonise the study of drug use prevalence in Belgium. (This task has been entrusted to BIRN.)

Mortality registers

Another task given to BIRN by the EMCDDA is an implementation of epidemiological indicators, notably on drug-related deaths and mortality among drug users. In May 1999, a drug-related deaths taskforce was convened by BIRN. This taskforce gathered experts on mortality (from the Communities, the Scientific Institute of Public Health and the NIS/INS), representatives of Regions and Communities through Sub-Focal Points and representatives of the National Police and other judicial organisations, such as municipal police forces and the Criminal Investigation Department. The main aim of this taskforce was to improve standardisation, harmonisation, quality and reliability of drug-related deaths information specially registered on the General Mortality Register (GMR) and now on special registers.

Historically, the GMR was under the authority of the Ministry of Economic Affairs. But most of the collected information concerned socio-demographic data. With the growing need to add medical data to this register, responsibilities were shared between the Ministry of Economic Affairs and the Ministry of Public Health which would code information using ICD codes. Socio-demographic data and ICD codes would then be transferred to the Ministry of Economic Affairs' NIS. In 1993, the responsibility for these data, previously held by the National Government, was transferred to the Governments of the three Communities. Consequently, the availability of the data now depends on the efficacy of the different Communities Administrations. Currently, a delay in obtaining national data occurs because of the lateness of some Communities in collecting the information. The coding system remains the responsibility of NIS. The goal of the taskforce is

also to improve communication and co-operation between the different partners.

Data collection starts with physicians filling out death certificates. The family of the deceased need to send these certificates to the municipality *they belong to,* not to the place where the death occurred. The municipality adds the demographic information to this certificate and sends the information, with the exception of the identification data, to the Community to which it relates. The Health Ministries of the three Communities then have to make sure that the NIS gets all the information, after having done the coding as well as the data-entry and having checked the validity of these certificates. The NIS computerise and validate the data according to their standards.

If the event is considered as violent, the death certificate is sent to the coroner but it is really difficult to get any information about the specific way data are analysed at that point.

To our knowledge the Justice Department has its own register. Cases are reported by the police and transmitted for recording to the Police Central Office. The data collected in this register mainly concern drug trafficking. The name of this register is POLIS and it is held by the National Police. The main objective of this register is the management of information registered in police reports. It covers the whole of Belgium. This system is not considered as reliable. Some municipal police offices however collect data on drug-related deaths. The Criminal Investigation Department is said to have its own system as well. There is however no information available yet on this system.

Several biases and time consuming procedures could be avoided. Experts from the drug-related deaths taskforce identified the lack of education of General Practitioners or Emergency Specialists in filling out the death certificates. They recommended specific academic training for the physicians focusing on the crucial necessity of data that have a public health perspective. Actually, one of the most important problems is that most of the time the death certificates give information only about the violent vs. non-violent issue of the death and secondarily on the circumstances of the death: for example, a respiratory failure can be stated as the immediate cause of death, but its aetiology is not pointed out. Therefore we can extrapolate that the main information is missing and drug-related prevalence rates are automatically under-reported. Another problem is the long, complex procedure needed to get the death certificate to its final 'location' registration. Each stop of the certificate leads to a precious loss of time and may generate some errors.

Data on drug-related deaths available from the General Population Register

The General Population Register or the Population Mortality Register, formerly Civil Registry Statistics, is therefore used to determine the number of deaths where drug use was involved. Aiming at the identification of mortality

due to drug use in the Population mortality register, the following codes of the 9th version of the International Classification of Diseases (ICD-9) were selected (alcohol was excluded when possible):

304 Drug dependence

305 Nondependent abuse of drugs

E850-E858 Accidental poisoning by drugs and medications: opiates and related narcotics, barbiturates, other sedatives, hypnotics, tranquillisers, antidepressants, psychodysleptics (hallucinogens), psychostimulants (amphetamines), Central Nervous System stimulants.

E950 Suicide and self-inflicted poisoning: analgesics, antipyretics, antirheumatics, barbiturates, other sedatives, hypnotics, tranquillisers, psychotropic agents, other specified and unspecified drugs and medicaments.

E980.0-.5 Injury undetermined whether accidentally or purposely inflicted by analgesics, antipyretics and antirheumatics, barbiturates, other sedatives and hypnotics, tranquillisers and other psychotropic agents, other specified drugs and medicament, unspecified drugs and medicaments.

The BIRN taskforce on drug-related deaths tried to develop a uniform definition of drug-related deaths in Belgium, using EMCCDA coding: Drug-Related Deaths Standard (DRD-Standard) (EMCDDA 1999).

Data presented in this paper summarise the Belgian data recorded in the GMRs using the DRD-Standard Version 1.0. (see Appendix for full details). The standard comprises a series of *underlying causes of death* as coded under ICD-9. Broad categories include:

1. Drugs psychosis
2. Drug dependence
3. Nondependent drug abuse
4. Accidental poisoning (overdoses included)
5. Suicide and self-inflicted poisoning
6. Poisoning with intent undetermined

In order to enhance the specificity of the substances causing death, about 11 substances classes were used alone or in combination:

1. Opiates and related narcotics
2. Barbiturates
3. Benzodiazepines
4. Other sedatives and hypnotics
5. Psychodysleptics
6. Cocaine

7. Psychostimulants
8. Local anaesthetics
9. Unspecified analgesics, antipyretics, antirheumatics
10. Unspecified other drugs acting on the nervous system
11. Unspecified other drugs

Methods

Using the procedure briefly described above, the DRD-Standard can generate 55 drug-related deaths items: a combination of the 11 substances classes and the 6 broad categories. A specific procedure is used to exclude double-counting of persons.

Available Belgian data so far for the whole country are limited to the years 1986 and 1988 to 1994. Data for 1987 and the period after 1994 are not available yet.

Statistical computations were made by comparisons of observed values with expected values in a traditional chi-square procedure. Expected values for chi-square were calculated in relation to the national population ratio between men and women (or range of year) for the year in question whereas percentages shown in the Figures refer to the respective ratio of male and female (or range of year) considering the total number of DRD cases for the year under consideration

Results

Figures 3.1 and 3.2 show the number of deaths per 100,000 inhabitants and the number of DRDs per 100,000 inhabitants respectively. Both death episodes and DRDs did not exhibit any significant changes over the period 1986-1994. Moreover no significant correlation existed ($r = 0.14$, $p<0.74$) between mortality prevalence rates and DRDs.

Figure 3.1. Deaths per 100,000 inhabitants in Belgium, 1988-1994

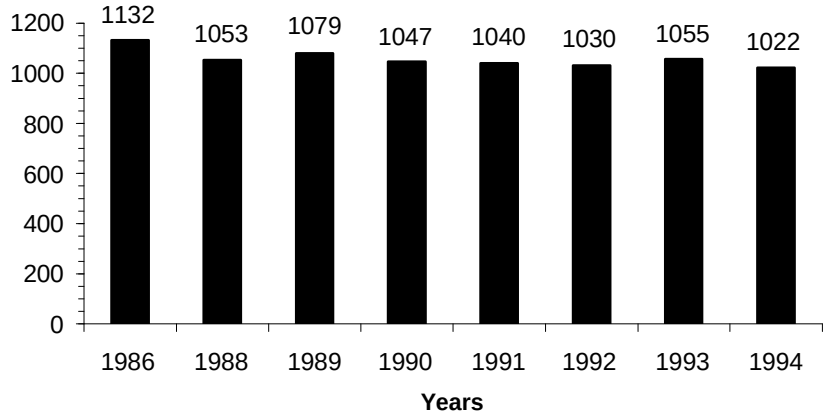
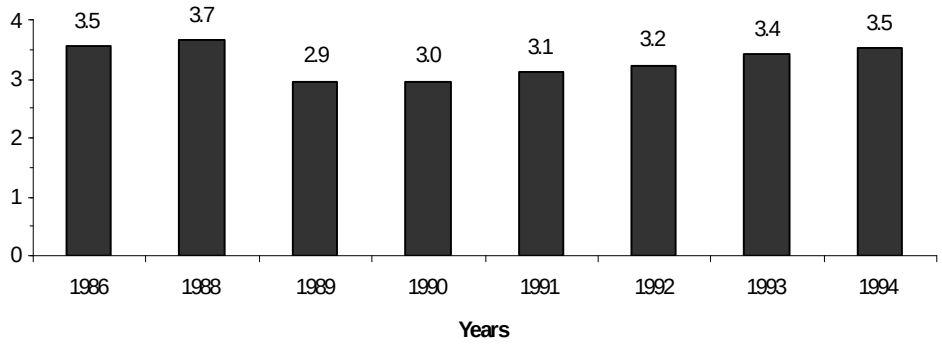
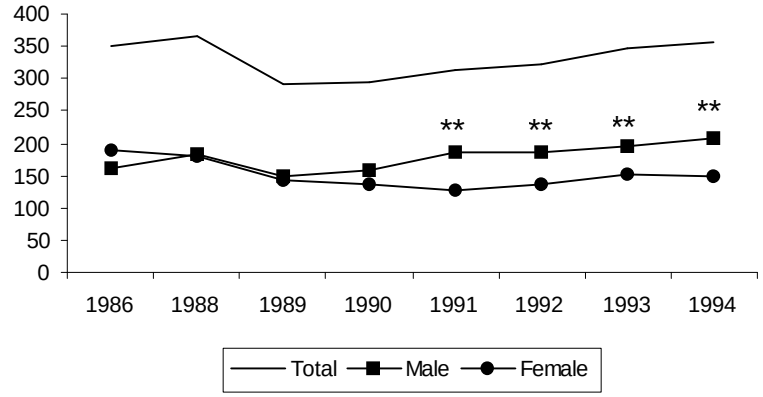


Figure 3.2. DRDs per 100,000 inhabitants in Belgium (EMCDDA DRD-Standard), 1986-1994



Figures 3.3 to 3.19 show different aspects of DRDs based on the DRD-Standard. The distribution by age and gender or age depicted in the diagrams must be carefully analysed: the percentages were calculated relative to the total DRDs (general, men, women or respective age range). Therefore, no weighting was applied to the gender or age distribution regarding the relative population size in these diagrams.

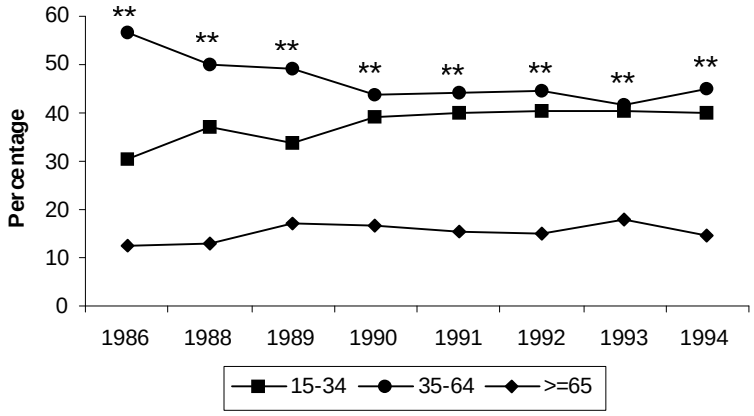
Figure 3.3. Number of DRDs in Belgium, by gender, 1986-1994



*** : Pearson chi-square significant at p<0.01*

Figure 3.3 shows a significantly higher rate of DRD in men compared to women from 1991 to 1994. The DRD also differed according to age distribution (Figure 3.4) for each year examined, relative to population distribution; both between the three age ranges considered and specifically between the age ranges 15-34 and 35-64 years.

Figure 3.4. Age distribution of DRDs in Belgium, 1986-1994



*** : Pearson chi-square significant at p<0.01*

Splitting these data according to age and gender (Figure 3.5), DRD affected more the young and middle-aged, especially men. Middle-aged women had significantly higher DRD rates then other gender age groups. Interestingly, there were no significant differences between women in the 35-64 and 15-34 age groups in 1992, and the statistical significance decreased from 1991 to 1994. Older women were more likely to be included in the DRD figures than older men, while younger women were significantly less likely than younger men to be represented.

Figure 3.5. Age by gender distribution of DRDs in Belgium, 1986-1994

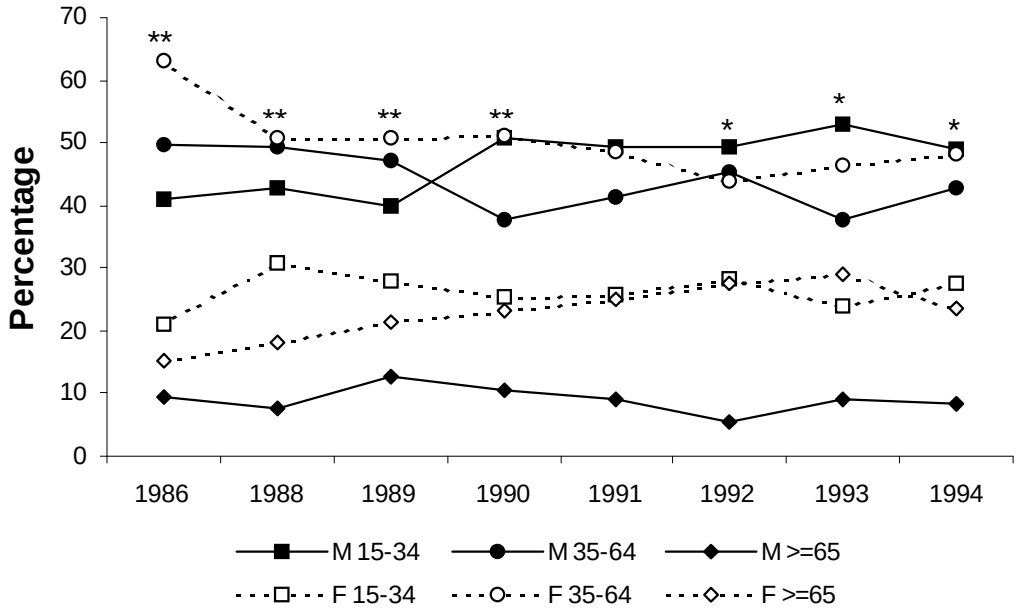
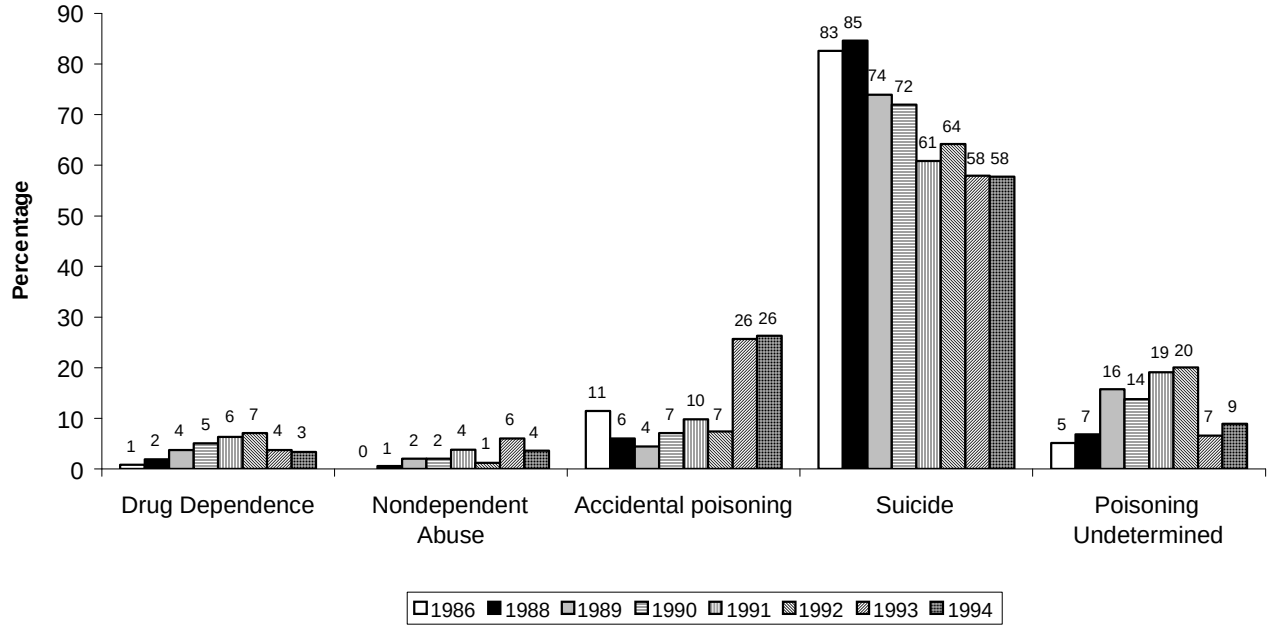


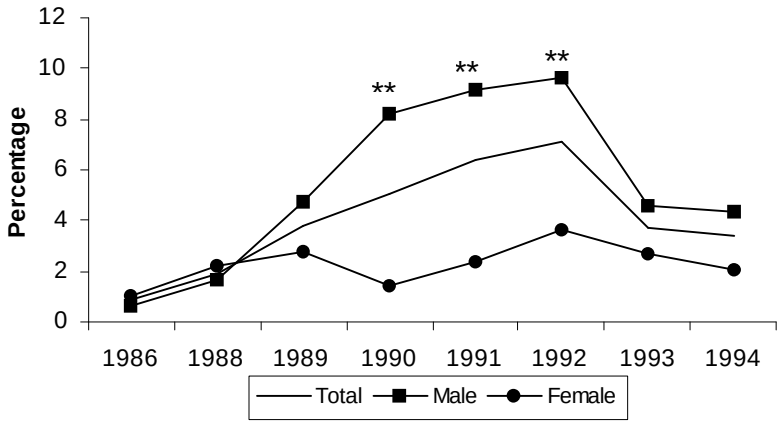
Figure 3. 6. DRDs in Belgium according to the broad categories of the DRD-Standard, 1986-1994



The next distribution (Figure 3.6) takes into account the broad categories described earlier. There was no case of DRD induced by drug psychosis (ICD-9 code 292). The most important DRD categories were represented by suicide (from 58% to 85%), accidental poisoning (from 4% to 26%) and undetermined poisoning (from 5% to 20%). Percentages varied widely over the years.

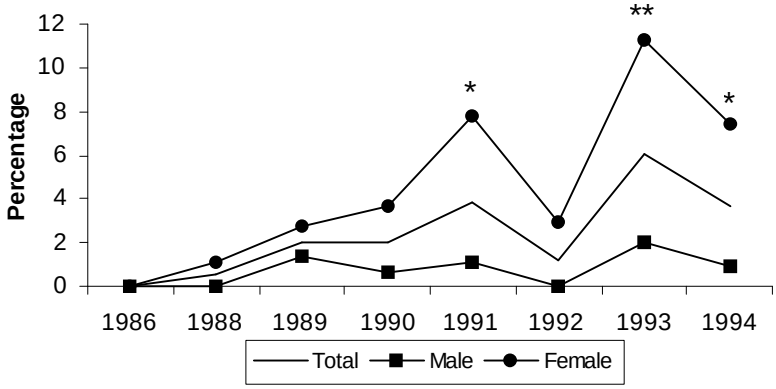
Figures 3.5 to 3.14 briefly describe differences by gender over the time for the 5 broad categories (Figures 3.7, 3.8, 3.9, 3.12, 3.14): drug dependence, nondependent abuse, accidental poisoning (including overdoses), poisoning undetermined, suicides and self-inflicted poisoning. Figure 3.10 depicts differences by gender in opiate-implicated overdoses (when an opiate is recorded alone or on combination in the database).

Figure 3.7. Drug dependence DRDs in Belgium by gender, 1986-1994



*** : Pearson chi-square significant at p<0.01*

Figure 3.8. Nondependent abuse of drug DRDs in Belgium by gender, 1986-1994

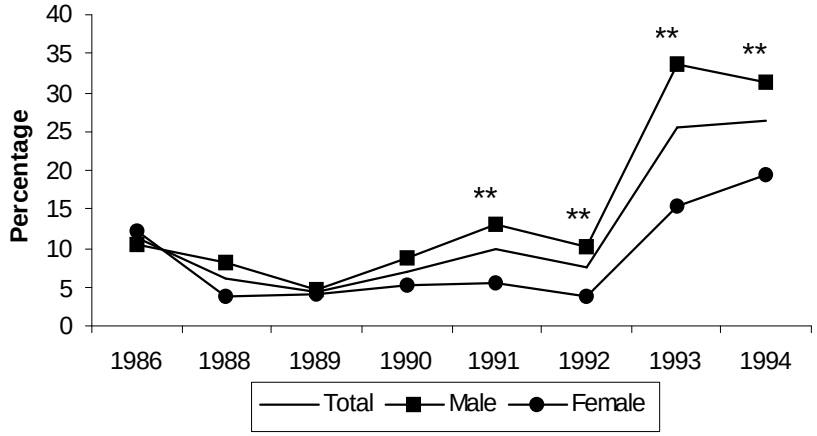


** : Pearson chi-square significant at p<0.05*
*** : Pearson chi-square significant at p<0.01*

Figure 3.7 depicts a significantly higher DRD rate among males for drug dependence during the years 1990 to 1992 while female nondependent abuse rates were higher for the years 1991, 1993 and 1994 (Figure 3.8).

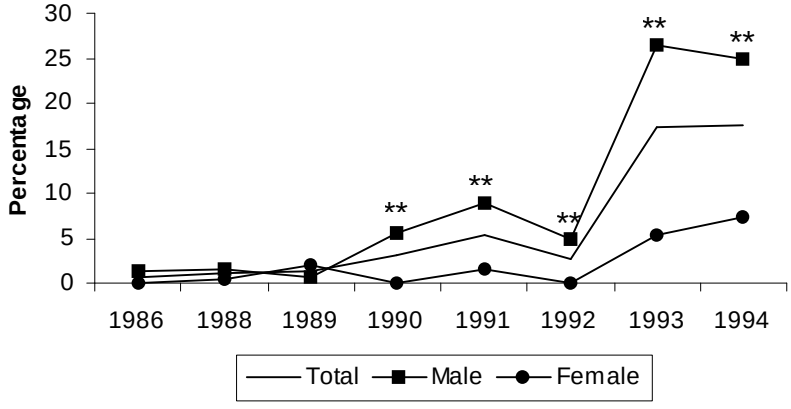
Accidental poisoning grew significantly during the years 1993-1994 from 10%-15% to nearly 30%, especially among men (Figure 3.9). This increase was mainly due to opiate overdoses (Figure 3.11). Moreover, there was a significant correlation (r=0.96, p<0.000) indicating the high relationship between accidental poisoning and opiate overdoses. Opiate overdose rates were higher among men from 1990 to 1994 (Figure 3.10). There is also a significant increase in the rate of opiate overdose in males, from 5% in 1992 to 25% in 1994.

Figure 3.9. Accidental poisoning deaths in Belgium by gender, 1986-1994



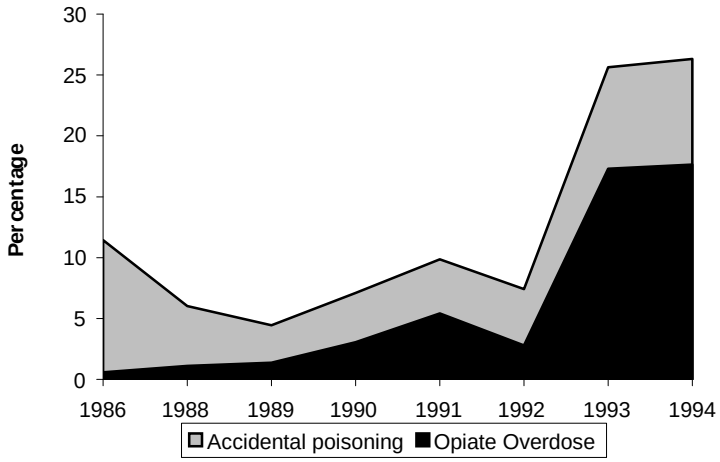
*** : Pearson chi-square significant at p<0.01*

Figure 3.10. Opiate overdose deaths in Belgium by gender, 1986-1994



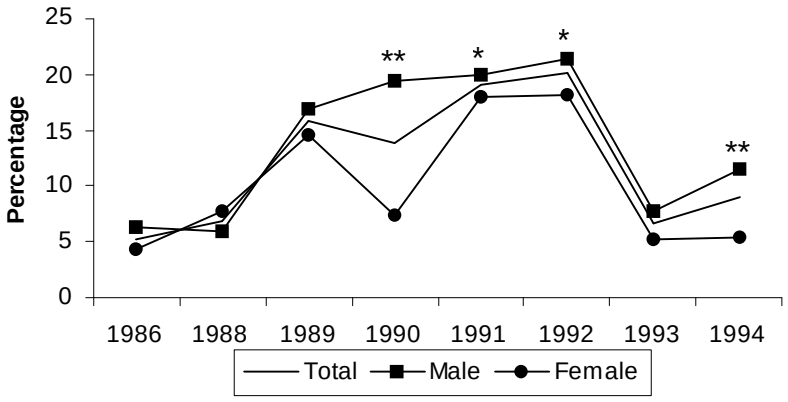
*** : Pearson chi-square significant at p<0.01*

Figure 3.11. Belgian opiate overdose deaths in the accidental poisoning category, 1986-1994



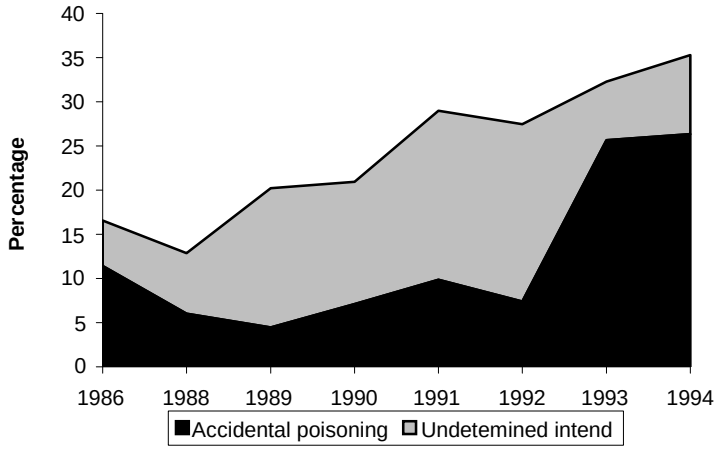
Poisonings of undetermined intent increased during the years 1989 to 1992: from 7% in 1988 to nearly 16%-20% during the years 1989 to 1992 (Figure 3.12). The increase was significantly higher among men for those years except for the year 1989. In 1993, the poisoning of undetermined intent rates fell back to the 1988 values before increasing again in 1994 (9%). At that time, once again, men were more affected than women. Splitting cases of accidental poisoning and undetermined intent gives a trend of a 'natural' increase in DRD rates (Figure 3.13).

Figure 3.12. Poisonings of undetermined intent in Belgium by gender, 1986-1994



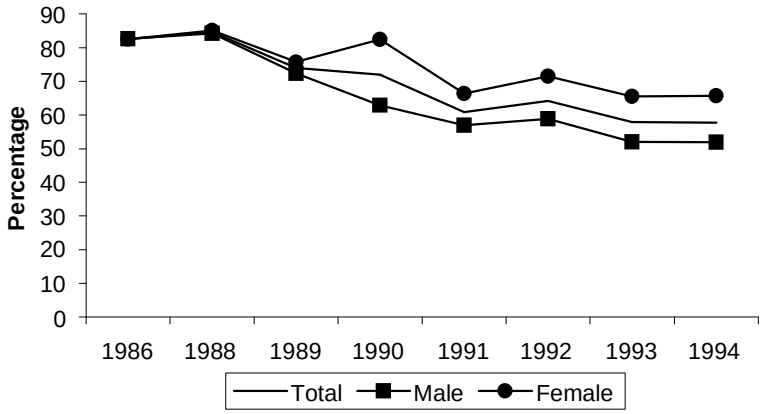
** : Pearson chi-square significant at p<0.05*
*** : Pearson chi-square significant at p<0.01*

Figure 3.13. Combination of accidental poisoning and undetermined intent deaths in Belgium, 1986-1994



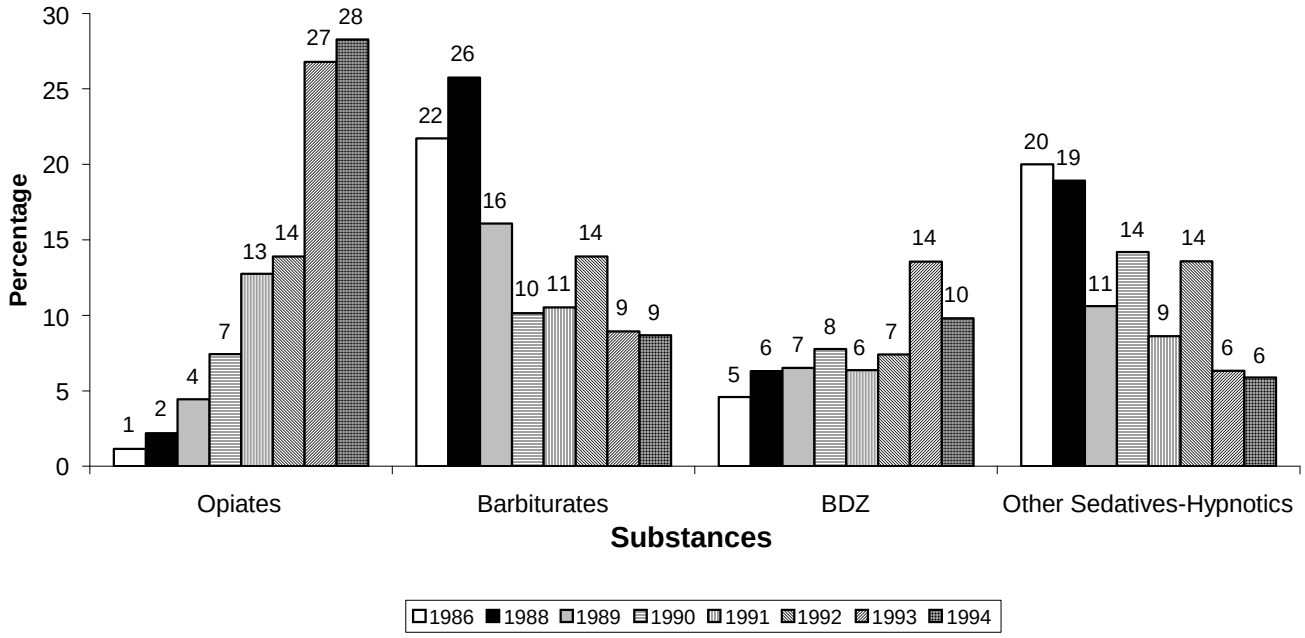
Even though previous underlying causes of deaths rates remained between 5% and 30%, suicides and self-inflicted poisoning were the most important causes of DRD: from 50% to nearly 80% during the years (Figure 3.14). Interestingly, previously observed gender differences were absent.

Figure 3.14. Suicide and self-inflicted poisoning deaths in Belgium by gender, 1986-1994



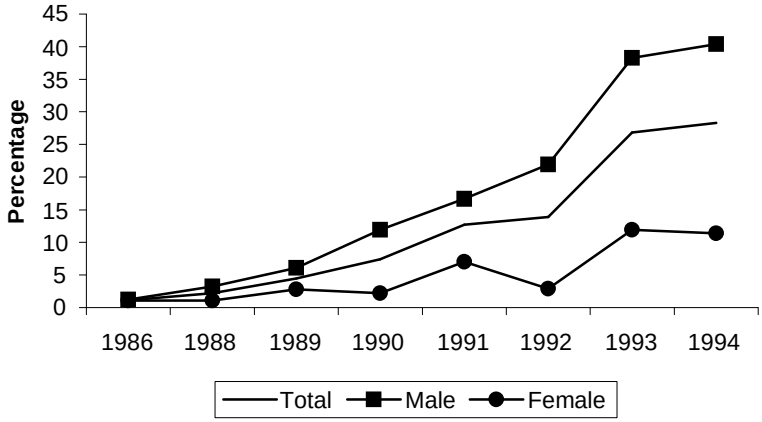
Figures 3.15 to 3.19 show the relative importance of substance classes involved in DRDs. All results are a combination of all the broad categories: drug dependence, nondependent abuse and accidental poisoning, suicide and undetermined intent. Substances were not equally involved in DRDs over the years (Figure 3.15). Opiate-related deaths increased from 1% in 1986 to 28% in 1994 whereas barbiturate-related deaths decreased from 26% in 1986-1988 to 9% in 1994. Variations in benzodiazepine-related deaths were stable from 1986 to 1992 (5%-8%) with an increase in 1993-1994 (10%-14%). Involvement of other sedatives and hypnotics also decreased from 20% to 6% over these years.

Figure 3.15. DRDs in Belgium according to the DRD-Standard substances, 1986-1994



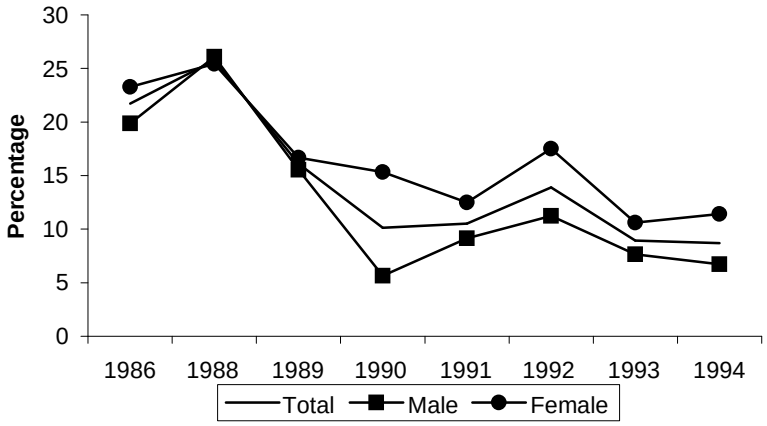
Opiate-related deaths (Figure 3.16) increased almost linearly, especially among men (from 6% 1989 to 40% in 1994) while other substances-related deaths (Figures 3.17-3.19) decreased equally between men and women, except for barbiturate-related deaths which decreased more significantly for men in 1990 (Figure 3.17).

Figure 3.16. Opiates-related deaths in Belgium



*** : Pearson chi-square significant at p<0.01*

Figure 3.17. Barbiturate-related deaths in Belgium, 1986-1994



** : Pearson chi-square significant at p<0.05*

Figure 3.18. Benzodiazepine-related deaths in Belgium, 1986-1994

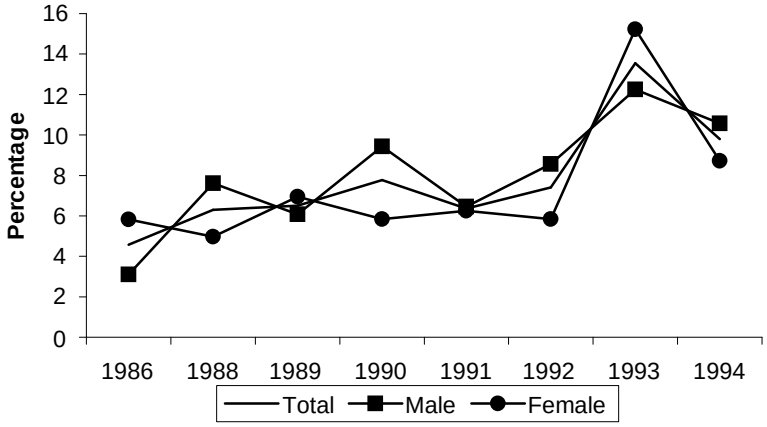
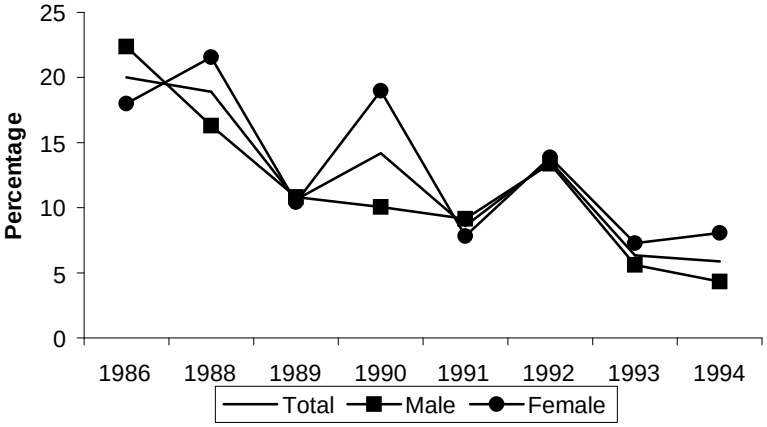


Figure 3.19. Other sedatives and hypnotics-related deaths in Belgium, 1986-1994



Discussion

This partial analysis has several limitations.

First of all, the statistical procedure could probably be changed, to benefit from a Poisson distribution analysis, considering the smallness of population sizes in some categories.

Secondly, despite statistical limitations, the analysed data show interesting results. Previously mentioned problems in data collection such as the filling out of death certificates by physicians could be identified by this data analysis. Indeed, the important level of undetermined poisoning (Figures 3.6 and 3.12) - about 10% to 20% - could be an indicator of the poor quality of data collection. Moreover, if DRDs are supposed to represent trends in drug-associated 'behaviours', a dramatic drop limited to 1992 for nondependent abuse (Figure 3.8) and for opiate overdoses (Figure 3.10) could reflect a problem of filling out death certificates rather than a specific effect on such a population. A similar explanation could apply in 1990 for undetermined intent in women (Figure 3.12), in 1992, again, for opiate-related deaths in women (Figure 3.16), in 1990 for barbiturates-related deaths in men (Figure 3.17), and for the sharp increase in 1988-89 in all opiate-related deaths (Figure 3.12). This hypothesis could be validated by splitting the two broad categories shown in Figure 3.13: accidental poisoning and undetermined intent. It is unreasonable to believe that accidental poisoning suddenly increased for the years 1993-1994 by such a proportion. This increase may instead reflect an improvement in data collection especially in filling out death certificates.

Thirdly, data on drug use prevalence rates are largely lacking. Consequently, it is difficult to know if increases or decreases in DRDs are associated or not with rates in the reference population, e.g. drug users.

Fourthly, because of DRD data collection limitations, DRD rates are necessarily underrated. Deaths where drug use is indeed a contributory cause of death are not taken into account: deaths where drugs are indirectly involved in a natural cause of death (e.g. cardiac diseases) or when there is an external cause of death other than poisoning.

However, even if Belgian data indeed seem unreliable, some results appear of particular interest.

Men, particularly from the young and middle-aged groups seem more affected than women. Interestingly, rates for older women increase over the years and tend to be higher than corresponding male rates. This could be explained by the fact that even if women live longer than men their quality of life could be poorer. Further analyses are needed to confirm this hypothesis.

The difference in drug dependence between men and women for the years 1990-1992 probably reflects the fact that men are much more involved in risky consumption than women. It could be hypothesised that the reduction observed during the years 1993-1994 may reflect the effect of the Belgian

methadone maintenance programme in general practice ratified in 1994. This observation must be treated with caution because of the smallness of the population (see Figure 3.6 for population size). Moreover, results shown in Figure 3.10 for opiate overdoses invalidate this hypothesis.

Suicides and self-inflicted poisoning were the most important cause of DRDs: from 50% to nearly 80% over the years. The progressive decrease over time could also lead to the conclusion that the Belgian regulatory control policy on the availability of specific substances (e.g. barbiturates or some other substances) has shown to be effective. This hypothesis could be reinforced by the fact that opiate-related deaths increased while other substance-related deaths seem to decrease during the years (Figure 3.15). This is particularly true for barbiturates-related deaths and other sedatives and hypnotic-related deaths. On the contrary, benzodiazepine-related deaths increased. This could reflect the rising consumption of flunitrazepam by young people. In 1999 the Belgian Health Ministry limited the availability of this substance. Therefore the analysis of DRDs for the years 2000-2002 may well show the effect of this initiative and confirm the utility of DRD data.

Conclusion

The Belgian administrative situation is extremely complex, even for Belgians. Firstly, there is a lack of coordination and communication at each level of decision making and in data collection, thus hampering the availability of reliable data on drug abuse and drug-related deaths. Various incompatible data collection systems on drug-related problem in general co-exist and are most of the time initiated by field workers to try to improve their practice.

Secondly, due to the difficulty in data accessibility, analyses of data to inform health policy decision-making are hampered and long delays are caused in accessing data, limiting the analyses needed to efficiently assess health policy decisions.

The results of this preliminary data analysis mainly lead to the conclusion that Belgian data are certainly incomplete, with many limitations in filling out the death certificate. Nevertheless, it shows the imperative need for relevant epidemiological data.

With the establishment of BIRN, this situation will certainly improve. The organisation has identified already major difficulties and proposed solutions to achieve a better understanding of drug-related death problems. BIRN plans to:

- Improve the communication and co-operation between the NIS and the Communities, as well as the transfer of data between the organisations at federal and Community level
- Develop a uniform definition of drug-related deaths

- Improve the confidentiality of medical data. This may also increase the subjective feeling of confidentiality of the data among general practitioners and thus improve the reliability of the data

- Design a study involving different Belgian universities looking at the information physicians in training get on drug-related matters and on filling out death certificates, in co-operation with the Medical Schools of these different universities

- Assess the possibilities for improving the physicians' training on drug-related matters, drug-related deaths and filling out death certificates in general

Acknowledgements

The authors wish to thank the Belgian Information Reitox Network for the data they kindly provided, and particularly Mrs Ann DeSmet, Belgian national co-ordinator of the DRD taskforce. We are also grateful to Mr Yvo Pirenne, coding expert of the French Community, Mr Luc Bils, director of the CCAD and Mrs Denise Walkiers, head of the National REITOX Focal Point.

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Chapter 4 Drug-related mortality in Denmark

B Sommer

Summary

The definition of drug-related death is under revision and from the year 2000 it is going to be the responsibility of The National Board of Health, who are dealing with all other statistics about mortality.

Drug-related mortality has increased in Denmark during the past 30 years since registration was started by the police authorities in 1971 from 1.2 per 100,000 to 6 per 100,000 inhabitants in 1999. Registration was inconsistent in the beginning particularly in the rural counties and part of the increase can be attributed to improved reporting. From 2000, registration is the responsibility of the National Board of Health and local health authorities who deal with all other mortality statistics.

Dødeligheden som følge af stofmisbrug har været registreret de sidste 30 år i Danmark af politiet. Der ses stigninger i dødeligheden omkring 1980 og 1990. Ændringer i registreringspraksis kan være en del af forklaringen. Der ses stor variation i dødelighed, med den største dødelighed i København, hvor den er tre gange så stor som i resten af landet. Registreringspraksis er forskellig i de lande, som har leveret data til denne monografi og sammenligning landene imellem må ske med forsigtighed.

Introduction

The population of Denmark is 5.2 million excluding Greenland and the Faroe Islands. Currently, about 5% are immigrants, half of which have a different ethnic background.

The official number of drug addicts is 12,500 (24 per 10.000 inhabitants) with a strong concentration in Copenhagen. Approximately 25% of the population live in the Copenhagen area. A recent capture-recapture study in the municipality of Copenhagen, revealed a figure of 4,000 drug addicts among its 470,000 inhabitants. In addition there might be an additional 2,000 addicts with a history of experimental use and mild dependence.

Data collection on drug-related deaths

Statistics regarding drug-related mortality in Denmark have up to now been the responsibility of the Danish police authority. Statistics are issued annually in ”The Annual Report” (Politiets årsberetning 1999). All 50 police districts, are instructed to report all cases where misuse of drugs are suspected,

including suicide and accidents. The following categories are requested to be reported:

1. Misuse of drugs listed in Act No. 391 of 21 July 1969
2. Use and misuse of pharmaceuticals in cases where the deceased is known as a user of the drugs as mentioned under 1
3. Use and misuse of drugs not mentioned under 1, with the intention of being euphoric

All reported cases are included in one of four groups by the Rigspolitiet assisted by medical guidelines developed with professionals from the National Board of Health:

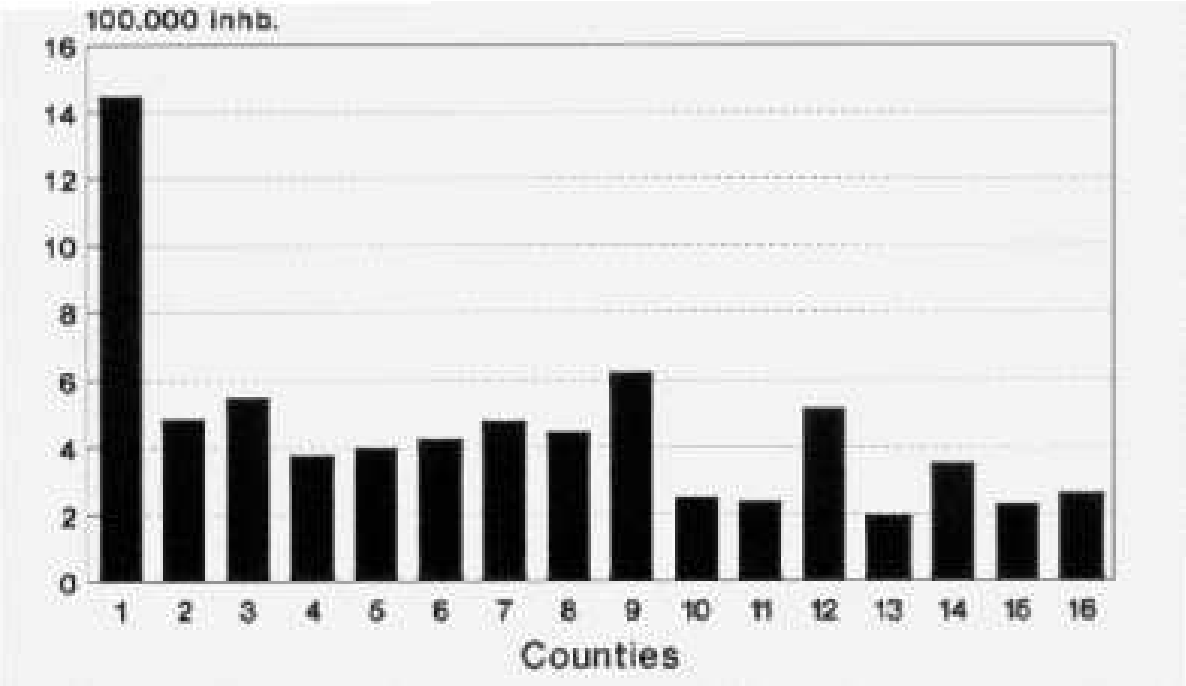
1. Death due to morphine and related synthetic drugs, in Denmark mainly heroin
2. The above combined with drugs like sedatives and painkillers
3. Sedatives, sleeping pills and painkillers
4. Cases of suicide, accidents and self-inflicted injuries linked to drug addiction

Figure 4.1 shows the distribution of drug-related death in Denmark's 16 counties from information obtained from the police districts.

Copenhagen municipality has a remarkable high death rate for which there is no simple agreed explanation. However, the death rate due to other causes in Copenhagen municipality is among the highest in Europe. Ringkøbing County has the lowest rate, one seventh of Copenhagen's. Whereas the figures for Copenhagen municipality have remained fairly constant over the last two decades, the total increase relates to an increase in the rest of Denmark including the suburbs of Copenhagen. It is unclear whether this increase is real or is explained by increased reporting from police districts which previously under reported drug-related deaths.

Figure 4.1. DRDs by county, in Denmark, 1994-1996

(*Source*: Tal fra Sundhedsstyrelsen, May 1999)

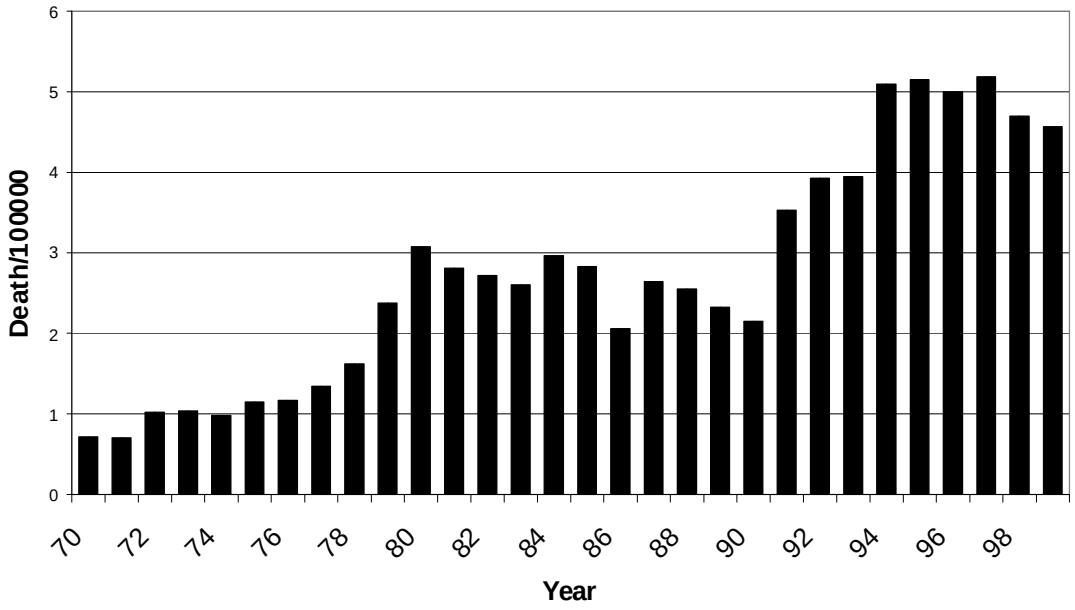


No.	County		No.	County
1	Københavns Kommune		9	Fyns Amt
2	Frederiksberg Kommune		10	Sønderjyllands Amt
3	Københavns Amt		11	Ribe Amt
4	Frederiksberg Amt		12	Vejle Amt
5	Roskilde Amt		13	Ringkøbing Amt
6	Vestsjællands Amt		14	Århus Amt
7	Storstroms Amt		15	Viborg Amt
8	Bornholms Amt		16	Nordjyllands Amt

Drug-related deaths in Denmark

Registration from 1970 to 1993 is based on ICD-8-codes. From 1994 ICD-10 codes have been used (World Health Organisation 1992).

Figure 4.2. Drug-related deaths in Denmark, 1970-1999



The risk of drug-related deaths has increased 6 times during the period 1970-1999 (Figure 4.2). In the first two decades it was mainly a problem seen in the Municipality of Copenhagen. The number of deaths has declined in the Capital and the increase during the last ten years is the result of development outside Copenhagen.

The average age among the deceased was 36 years in 1999 compared to 31.5 years in 1991 (National Board of Health 1999). Women account for 15% to 25% of cases. The great majority of drug-related deaths are caused by overdose of heroin and related substances. Only a minority are due to suicide. Death due to ecstasy was not seen until 2000 when two deaths occurred in the first half of the year.

A drug-related death must be reported to the local police who, together with Medical Officer of Health (in Copenhagen The Forensic Department), conduct an inquest. The National Board of Health has instructed all suspected drug-related deaths to be subject to a post mortem examination by the forensic department. All three forensic departments in Denmark are using the same guidelines including a battery of chemical analyses for toxicology screening.

On the basis of the criminal register, the inquest and the report from the forensic department, the local police decide which cases should be reported centrally (Rigspolitichefen). There are written guidelines about this procedure from Rigspolitichefen to the local police, but it is short and non-specific.

Discussion

Prevention is an ongoing process. National campaigns and programmes at county and district level have received increasing funds over the past years.

The value of methadone as an effective measure in harm reduction is still discussed and local policies differ from county to county.

The penalty clause for illicit drug use has been increased in the last decade as a political deterrent.

Possession of drugs for personal consumption, however illegal, does not normally lead to prosecution at the first arrest.

Possession or trading in more than 15 grams of marijuana or 1-3 grams of heroin is considered a violation of Code of Euphoriant drugs with a maximum of 18 months imprisonment.

Possession of more than 10 kg marihuana and 25 grams of heroin is a violation of the Penal Code with a maximum term of imprisonment of 6 years (10 years in aggravated cases).

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Chapter 5 Drug-related mortality in France

C Guionnet and S Wieviorka

Summary

The mortality rate of drug-addicts is estimated in France to be three times more prevalent than in other comparable populations. But, in the absence of a real centralised system of statistics about drug addicts in France, their mortality, either drug-induced or from natural causes linked or not with drug use, is still an estimation.

La mortalité liée à l'usage de drogue en France est estimée à un taux trois fois supérieur à celle d'une population comparable. Néanmoins en l'absence d'un système de regroupement et de traitement global, les statistiques de la mortalité en relation directe ou indirecte avec l'usage de drogue n'est qu'une une estimation imparfaite.

Drug addicts and mortality

The mortality linked with drug use is only one part of the total mortality prevailing in the drug addict population because their deaths are not always directly in connection to their use or abuse of drugs but often with their way of life. In a drug taking population there are more suicides, more accidents and homicides, and of course more illnesses than in the general population. It is often also difficult to know the number of fatal cases of violence, accidents, self-harm and infectious diseases (OFDT 1995) where drug use was involved.

So, in drug-related deaths, we have to distinguish between those mortality episodes that happen as a consequence of excessive consumption of a product (overdose), and those in which drug use is simply associated to the death (co-incidental).

Population and deaths

During the last census of the French population (September 1999) there were 60,173,170 people in France.

The statistics about drug addicts and patterns of drug consumption are very difficult to draw up. The total number of drug addicts can only be estimated. It is very variable according to different sources. From 70,000 to 300,000 heroin users are estimated to be active in France. This lack of data can be accounted for as follows:

- Traditionally the French are not very interested in epidemiology
- The law about illicit drugs in France (30 January 1970) provides free care with anonymity making it impossible to collect valid data

Medico-legal aspects

For every death i.e. suicide, depression - a certificate is filled out and signed by a Medical Doctor. Where the principal reason of the death and, if available, a supplementary one, is caused by drug abuse it is possible that it does not appear.

When the death is suspected to be violent this certificate is not signed so the forensic process is applied. Usually there is an autopsy and often toxicological analyses. There are forensic institutes (Instituts Médico-Légaux) in the country who have the capacity and are entitled to conduct such investigations.

Data on drug-related death

Drug-related deaths are collected in two main independent ways and a supplementary one:

1. Police, Gendarmerie and Customs know the deaths in relation to overdoses or accidents as a result of using drugs. The Office Central pour la Répression du Trafic Illicite des Stupéfiants (OCRTIS) from the Ministry of the Interior collects these data from all the police departments in the country.

2. The Institut National pour la Santé et la Recherche Médicale (INSERM) collects all the death certificates and so all the deaths are collated in connected to drug use and those in which drugs have been mentioned as an additional reason.

3. The Instituts Médico-Légaux (I.M.L.) have their own data about the deaths in which an autopsy has been performed but these results are not always passed to INSERM.

Results

OCRTIS data are considered as the best of the three potential sources of information. OCRTIS' reports (1999) are published every year. They give information about drug classes and distribution in France, of drug-related arrests and seizures. But it is only a small part of the picture:

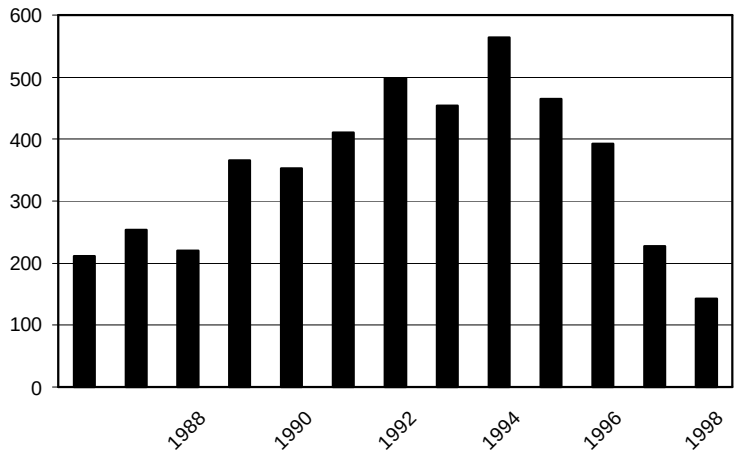
In the city of Paris and in its outskirts, a study (Lecomte 1995) has shown in 1990 a considerable underestimate of the death rate because official statistics captured only 36% of real deaths during the same period and the same 24% for the city of Paris alone.

It is estimated that in the Paris region the rate of death by usage of narcotics is 29.4 per million inhabitants. This frequency peaks at 25 to 29 years then decreases quickly to become almost unimportant after 40 years of age.

In the whole of France (Figure 5.1) DMDs are responsible for 12% of deaths in those aged between 20 and 29 years. Drug addiction as a cause of death is only surpassed by AIDS and suicide.

From 1986 to 1998 DMDs more than doubled. This increase is a reflection of an increase of drug use, a deterioration in the health of drug users and some evolution in the consumption of products. However, since France has caught up with a delay in treatment for substitution therapy (1994) with the development of methadone treatment (6,000 patients in 1998) and especially the wider availability of prescriptions for buprenorphine (60,000 patients in 1998), DMDs have gone down since 1998.

Figure 5.1. Drug-related mortality in France, 1986-1998 (*Source:* OCRTIS)



Drug-related death

The socio-demographic characteristics of recorded deaths differ according to the sources. The victims of death by overdose are essentially young male adults (85%) between 29 and 39 years, living alone and unemployed. Since 1990, the average age of death has remained at 30 years (Table 5.1)

Table 5.1. Place of death, age, sex-ratio and nationality of DRDs, France, 1995-1998

	1995	1996	1997	1998
Place of death (%)				
Home	63	64	66	70
Street	13	12	14	11
Hospital	7	7	6	6
Any house	10	12	7	10
Diverse	7	5	7	3
Age (years)				
Average	29	29	30,5	30
<16	3	1	2	0
16-20	23	16	6	7
21-25	100	88	41	27
26-30	179	149	71	43
31-35	114	87	66	37
36-40	32	36	30	18
41>	14	16	12	11
Sex-ratio (%)				
Males	85%	85%	81%	87%
Females	15%	15%	19%	13%
Nationality (%)				
French	91%	90%	88%	87%
Strangers	9%	10%	12%	13%
N	465	393	228	143

In 1998, the 143 deaths reported from the 9 *départements* listed in Table 5.2 (there are 90 *départements* in France) made up 69% of the total drug-related deaths.

Table 5.2. DRDs in the top 9 French départements, 1998

Département	Number of deaths
Paris	32
Nord	15
Hauts-de-Seine	10
Seine-St-Denis	10
Val-de-Marne	6
Val-'d'Oise	6
Essonne	6
Bouches-du-Rhône	6
Rhône	6

Causes of drug-related death

In 1994, 564 deaths by overdose were notified to OCRTIS. Heroin was implicated in 90% of cases. It is likely, however, that there was a previous consumption of alcohol or medicines in a number of cases. Since 1994, heroin has become less likely to be implicated with alcohol whereas the involvement of other drugs (prescribed or not) is on the increase (Tables 5.3 and 5.4).

Table 5.3. Distribution of drugs implicated in death, France, 1995-1998 (%)

Drug	1995	1996	1997	1998
Heroin	83	85	72	64
Drugs	15	12	25	29
Solvents	1	<0.5	<0.5	1
Cocaine	1	2	3	6
Others	<0.5	<0.5	<0.5	0

Table 5.4. Other drugs implicated in death, France, 1997-1998 (No.)

	1997	1998
Chlorazepate	9	6
Morphine (all forms)	0	5
Subutex	6	3
Flunitrazepam	7	4
Methadone	7	4

Conclusion

With the increased prescribing of buprenorphine in 1994 the curve of the drug-related death has come down. The direct access of buprenorphine delivered by the general practitioner caused concern since it could become another easily accessible opiate for sale on the black market. Furthermore, the soluble character of buprenorphine might also encourage patients in the practice of intravenous use with consequential public health concern for the spread of AIDS and hepatitis. The introduction of methadone substitution therapy is slowly catching on and will contribute to further decreasing drug-related death in France.

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Chapter 6 Drug-related mortality in Germany

J Blanke, G Hauptmann and SC Rösinger

Summary

In Germany the number of drug-related deaths increased to over 2000 p.a. in 1991 and 1992, from 1993 to 1999 the numbers were more or less stable at around 1700 p.a.

Persons older than 30 years were most frequently concerned. The statistics included also those who died from longer-lasting drug-related diseases.

An analysis of the drug-related deaths in the study of rehabilitation of i.v. drug addicts in methadone maintenance treatment in North Rhine-Westphalia (1988-1993) revealed that the number was comparable to other European studies. There was a high risk for those who had to quit the project.

Die Anzahl der Drogentoten stieg in Deutschland 1991 und 1992 zu einem Gipfel von über 2000 Toten pro Jahr. Danach stabilisierte sich die Zahl um 1700 jährlich mit leichten Schwankungen. Betroffen waren vor allem die über 30-Jährigen.

Die Statistik schließt auch die Toten ein, die an Langzeitfolgen des Drogenkonsums verstarben.

Eine Analyse der Drogentoten im NRW-Erprobungsvorhaben (1988-1993) ergab, daß die Anzahl der Drogentoten anderen europäischen Studien entsprachen und ein besonderes Risiko für die aus dem Programm ausgeschlossenen Abhängigen bestand.

Introduction

In recent years the numbers of DMDs have been of great importance for medical and political reasons. They are indicators of the success or failure of drug-related policies.

Data collection on DMDs

The Bundeskriminalamt applies the following definition of drug-related death to the German statistics: all cases in which death has been a consequence of drug abuse, including

- Overdose
- Long-term misuse
- Suicidal ideation
- Drug accidents

Often it remains difficult to differentiate between overdose or suicide. Every DMD is registered by the police and the Public Health Services.

In total, it is estimated that there are 150,000 drug addicts in Germany out of a population of 79 million inhabitants. For 1999, we have calculated an annual rate of 1.15% deaths among all addicts and an annual rate of 0.0013/100,000 population.

Figure 6.1. Number of DMDs, Germany, 1985-1999 (*Source*: Bundeskriminalamt, 1999)

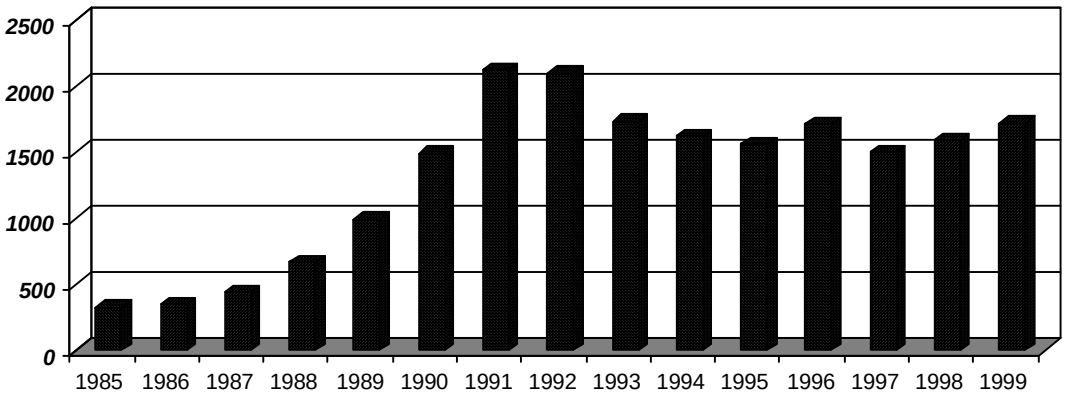

Figure 6.2. Distribution of age among DMDs, Germany (*Source*: Bundeskriminalamt, 1999)

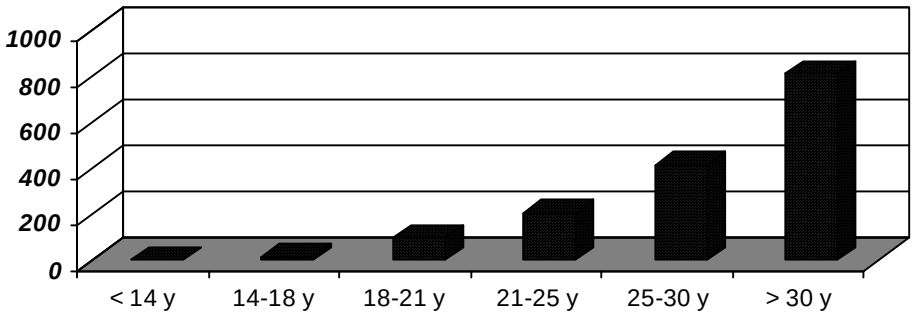

Figure 6.1 shows that there was an increase in the number of drug-related deaths during the late eighties, peaking in 1991. Since 1993 the numbers

have remained stable with little fluctuation. Figure 6.2 shows how the risk of death increases with age.

In Berlin in 1998, 15 % of deceased addicts were found in public places and 66.3 % in flats. Fifteen percent were foreigners (Senat der Stadt Berlin 1998).

It is assumed that most of the fatal cases are due to the use of heroin. Unfortunately, toxicological analyses and postmortem examinations are infrequent.

In 1998, 1674 drug-related deaths were reported across Germany. In 240 of these cases methadone was detected, but it was not evident that it was the cause of death (Bundeskriminalamt 1998). As a result, the treatment centres became aware of methadone spilling over into the black market and decided to stop 'take home' prescriptions (Servais 1999)

Many drug addicts do not die from substance abuse directly but from related diseases such as HIV-infection, hepatitis or tuberculosis. Commonly, they too appear in the drug mortality statistics.

Causes

In recent years several reasons for the amount of drug mortality have been put forward:

- The unknown quality and purity of content of opiates in 'street heroin' (varying from 0% to 80%). Such inconsistency in quality creates pockets of drug-related deaths as, for example, in Bremen in 1997.

- The addition of lidocaine to cocaine also led to increased drug-related morbidity and mortality.

- Codeine maintenance therapy was limited in the mid-nineties, several patients tried to switch to methadone but could not immediately find a new arrangement. This might have caused some fatalities in the Southern Ländern of Germany, where codeine was widespread.

Discussion

'Druckräume' (injection rooms) are facilities where heroin can be used under hygienic and safe conditions. This can minimise the risk of overdose because medical help is immediately available. The number of drug-related deaths was reduced in Frankfurt am Main from 147 in 1992 to 31 in 1996, after a 'Druckraum' was established.

Hauptmann (1999) analysed the data of the 'Erprobungsvorhaben NRW' (study of rehabilitation of i.v. drug addicts in methadone maintenance treatment, North Rhine-Westphalia) concerning drug-related deaths. Over a period of 9 years from 1988 to 1996, 8 treatment centres in Western Germany participated with a total of 240 patients. Included is a follow-up period for the years after treatment (Table 6.1).

Table 6.1. Impact of methadone treatment on DRD in North Rhine-Westphalia: cumulative distribution

Treatment	Total years in observation	Deaths		Mortality per 1000 years
		No.	%	
All participants	1200	32	2.7	26.67
During MMT	1051	18	1.7	17.13
After MMT	149	14	9.3	93.96

MMT = methadone maintenance treatment

These numbers focus on the high risk for patients after methadone maintenance treatment has been interrupted or terminated. In this group the incidence of suicide and/or overdose was relatively high.

Our data were quite comparable to those of the Grönbladh's (1990) study - see Table 6.2.

Table 6.2. Comparison of survival rates for MMT patients, North Rhine-Westphalia and Uppsala

Survival rate	NRW	Uppsala
After 5 years	87%	89%
After 8 years	80%	79%

These data led us to maintain the patients longer in treatment, and not to exclude them hastily.

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Chapter 7 Drug-related mortality in Greece

L Athanasiadis, C Rogotis, P Alektoridis, T Revenakis and E Piperidou

Summary

The rate of drug-related deaths in Greece is rising and it is considered one of the most rapidly increasing in Europe. Relevant data collection is difficult, fragmented and the possibility of gross under-reporting is high. The two main national data sources for drug-related deaths are police reports and the National Centre for the Documentation and Information about Drugs and Addiction (NCDIDA) reports. According to police reports there has been a continuous increase of drug-related deaths since 1985 with the rate almost doubling between 1993 and 1995. According to the NCDIDA 1998 report 94% of cases were single, 88% were male, 70% were reported in the Athens district, 57% had higher education and 45% were between 21-30 years old. Heroin is by far the most implicated substance and there has been an increase in deaths for people under 21 years of age.

The Psychiatric Hospital of Thessaloniki Addiction Services have also reported 52 drug-related deaths (suspected or confirmed) out of 1500 people known to their services between 1992-1998. The above number includes direct or indirect deaths such as deaths due to drug-related illness or accidents.

Overall the positive role of the development of methadone substitution programmes towards the relative reduction in the increase of the incidence of drug-related deaths has been emphasised.

Ο αριθμός των θανάτων στην Ελλάδα από τη χρήση τοξικών ουσιών αυξάνεται συνεχώς και θεωρείται ένας από τους πιό ταχύτερα αυξανόμενους στην Ευρώπη. Η σχετική συλλογή πληροφοριών είναι δύσκολη, αποσπασματική και ο αριθμός των δηλώσεων είναι πολύ μικρότερος του πραγματικού. Υπάρχουν δύο κύριες πηγές πληροφοριών. Η πρώτη είναι οι αναφορές της αστυνομίας και η δεύτερη οι ανακοινώσεις του Εθνικού Κέντρου Τεκμηρίωσης και Πληροφόρησης για τα Ναρκωτικά και τον Εθισμό. Σύμφωνα με την πρώτη, από το 1985 υπάρχει μια συνεχής αύξηση, με σχεδόν διπλασίαση του αριθμού θανάτων μεταξύ 1993 και 1995. Σύμφωνα με τη δεύτερη το 1998, το 94% των νεκρών ήταν άγαμοι, το 88% άρρενες, το 70% προέρχονταν από την περιοχή της Αττικής, το 57% είχαν ανώτατη εκπαίδευση και το 45% είχαν ηλικία από 21 μέχρι 30 χρονών. Η ηρωίνη αποτελούσε κατά πολύ την πιο συχνή αιτία θανάτου και υπήρχε ανησυχητική αύξηση των θανάτων ατόμων κάτω των 21 ετών.

Οι Υπηρεσίες Εθισμού του Ψυχιατρικού Νοσοκομείου Θεσσαλονίκης, έχουν δηλώσει 52 θανάτους (πιθανούς ή βεβαιωμένους), από τα 1500 άτομα που ήρθαν σε επαφή με τις υπηρεσίες από το 1992 ως το 1998. Ο παραπάνω

αριθμός περιλαμβάνει θανάτους αμέσως ή εμμέσως οφειλόμενους σε χρήση τοξικών ουσιών.

Γενικά έχει επισημανθεί ο θετικός ρόλος των προγραμμάτων υποκατάστασης με μεθαδόνη, στην σχετική επιβράδυνση της αύξησης του αριθμού των θανάτων από τη χρήση τοξικών ουσιών.

Overview of drug-related death in Greece

Introduction

Greece is a south-eastern European country, a Republic, and a member of the European Community. The majority of its ten million inhabitants are of the Greek Orthodox faith. The capital of Greece is Athens and the second biggest city is Thessaloniki, in the north of the country. Many of the principal addiction services (hospital departments, therapeutic communities, etc.) are based in these two cities.

It is difficult to estimate the total number of drug addicts in Greece. The number of heroin addicts could be sixty to seventy thousands, but the real number may be different.

The “National Centre for the Documentation and Information about Drugs and Addiction” or NCDIDA (Greek focal point for the EMCDDA) has published the results of two 1998 research projects on the use of drugs. Two samples were used, one of nine thousand students aged 13-18 years, and another one of four thousand young people aged 12-24 years. The results indicate that there has been a rise in illicit drug use, especially in the last five years. The commonest illicit drug is cannabis (in the 18-24 year age group, with one in three men and one in ten women experimenting with cannabis). The use of new drugs is also on increasing and is related to nightlife entertainment.

The above mentioned Centre collected and published the 1998 summative data from several Addiction Treatment Services in Greece. It appeared that approximately 92% of those who applied for help to the Health Services were heroin users. More than 50% were using more than three substances (polydrug users). Intravenous use was gradually diminishing but recent needle sharing was increasing.

The number of arrests and convictions for drug-related offences is rising in Greece. In 1998 the Authorities pressed charges for drug-related offences on approximately 11,000 people, that is 12.8% more than in 1997. In May 1999 one in every three inmates who were serving prison sentences or were waiting trial had been arrested for drug-related offences.

Positive hepatitis C status in Greek drug users is common (70-80%). Compared to those in other European countries, drug-related AIDS cases in Greece appear to be relatively few. According to the “Centre for the Control of

Specific Infections", 1870 AIDS cases were reported in Greece between 1985-1998. Seventy-two (3.9%) sufferers were intravenous users. However there is still a lack of a systematic collection of data on the HIV status of drug users.

There are also difficulties in estimating the prevalence of hepatitis and tuberculosis cases in drug users. The same applies to the direct psychiatric consequences of drug use and on co-morbidity, including suicide. All these factors create serious problems in making an accurate estimate of drug-related deaths in Greece.

Data collection on drug-related death

In this chapter "drug-related deaths" (DRDs) are defined as deaths that have been officially reported as being a direct result of illicit drug use (fatal overdose, usually due to heroin or combined use of heroin-other substances), unless otherwise specified. As a consequence, a possibly great number of fatalities that are indirectly related to drug use (e.g. accidents in which intoxicated individuals are involved, psychiatric and medical consequences etc.) are not included.

In cases of suspicious death, the police order a forensic examination which may include an autopsy and toxicological analysis. The verdict may or may not indicate drug use as the cause of death.

The Greek police report drug-related deaths whenever they occur and publish data periodically and on an annual basis. The NCDIDA also publishes reports on drug-related issues in Greece issued by a special Board.

Results

Greek police reports, issued by the Ministry of Public Order, indicate that the number of fatal overdoses (illicit drug overdose or death due to combined use with other substances) rose between 1985 and 1998. A sharp rise was observed in the years 1994-1996 (78 deaths in 1993, 146 in 1994, 176 in 1995, 222 in 1996). A moderate rise followed (232 fatalities in 1997, 243 in 1998) In 1998, 255 deaths were initially reported and 243 were finally confirmed as drug-related. In the 1999 NCDIDA report 265 fatalities were noted.

Heroin has been chiefly implicated in the fatalities (213 of the 222 deaths in 1996, 222 of the 232 deaths in 1997, 241 of the 243 deaths in 1998). Between January 1988- June 1999 only 7 fatalities have been attributed to cocaine.

The NCDIDA included the following information, based on police data, in their annual report for 1998:

- The majority of the fatalities are males (88.3%), a percentage similar to the ones reported over the years
- Forty-two percent were over 30 years of age, 45% between 21-30 years, 13% under 21. Fatalities in the under-21 group were just 4% in 1995 but a rise has been observed since, with a peak in 1998.
- Seventy percent of fatalities were reported in Attika (district of Athens) and 16% in the district of Thessaloniki
- Nearly all cases (98.3%) were Greek nationals
- Ninety-four percent were single
- Thirty-six percent had completed basic (six years of studies) and 58.6% higher education

Discussion

The increasing number of deaths and the national policy on drugs appear to be a matter of serious concern in Greek society. The daily newspaper "Elevtherotypia" ("Free Press") conducted a cross-party (all parties with the exception of the Communist Party) survey in a sample of 65 out of the 300 MPs in the Greek Parliament in May-June 1999. The report was published in the newspaper in October 1999. The MPs were asked - among other questions - whether they believed that control policies on drugs have been effective, knowing that Greece appears to have the most rapidly increasing rate of drug-related deaths in Europe. The majority (64.5%) believed that the present policy is ineffective and 14% advocated the need for changes.

Another matter of concern is the increasing number of deaths in the under 21 years age group. This might be related to an early age of first use. According to an Athens University professor V. Artinopoulou in an interview for the "Nea" ("News") newspaper in October 1999, an increasingly greater number of young people start using (other) drugs and many of them pass on to heroin. The peak of the death rate observed in ages 21-30 might be due to an increasingly earlier initiation and longer periods of heroin use.

According to "Nea" (October 1999), senior officers of the Drug Squad believe that the recently established methadone treatment services and effective police control have greatly contributed to the recent (since 1997) relative stability of the number of fatalities. Also, a new Drug Squad that specifically deals with incidents taking place throughout the Greek borders with neighbouring countries seems to have borne positive results.

The 1999 NCDIDA report comments on the rate of drug-related mortality in Greece. The report views the increasing number of users, polydrug use, the lack of information, poor physical health and patterns of use after relapse as major contributing factors. However, the report underlines the positive role that the substitution programmes play in Greece.

Other measures for the prevention of both drug use and drug-related mortality include the establishment of new OKANA ("Organization against Narcotics")

Services (e.g. expansion of the network of “Information and Prevention Centres” nationwide), development of NHS and non-NHS Services, projects targeting high risk groups, easier access to help in prison, educational and training programmes, public campaigns on drug use, and several other prevention, treatment and rehabilitation activities.

Dr. Maliori, MEP and ex-president of OKANA (Nea 2000) argues that monitoring and other differences between the European countries do not allow accurate comparisons in mortality rates and therefore Greece might not lead in this area as it appears.

Drug-related deaths in North Greece

Introduction

The number of drug-related fatalities is generally rising in most European Countries (Orti *et al* 1996, EMCDDA 1999). It appears that in Greece drug-related mortality is an increasing problem (Elevtherotypia 1999, NCDIDA 1999, Nea 1999), and is a matter of serious concern.

In Northern Greece there are a number of NHS and non-NHS services that offer help to - mainly - opiate and polydrug users. The Psychiatric Hospital of Thessaloniki (capital of Northern Greece and second biggest city in the country) operates a number of NHS Services which include a counselling and information service, a detoxification ward and a therapeutic community. All these services operate under an integrated policy. Drug addicts who apply for help can be admitted to the detoxification ward through the Counselling and Information Service (more than 200 admissions per year). Following their detoxification they may choose to continue treatment in the therapeutic community. The present report focuses on drug-related deaths of people known to the above mentioned services. Data from an outpatient day-centre service of the Psychiatric Hospital of Thessaloniki, are not included.

Methods

In this section DRDs are (1) a direct result of illicit drug use (fatal overdose, usually due to heroin or combined use of heroin-other substances), (2) fatal accidents (e.g. traffic accidents) of individuals who were under the influence of these substances at the time of the accident, and (3) a result of drug-related illness, unless otherwise specified.

Sources of information

Our sources of information have been:

- The media (42 cases)
- Family of the deceased (4 cases)
- Other (4 cases)

Results

According to our sources, in the years 1992 (the year the Psychiatric Hospital of Thessaloniki Addiction Services gradually started to operate) to 1998, 1500 drug addicts applied to our Services for help. It has been confirmed that 12 of them had a suspected and 40 a confirmed drug-related death. Ten more fatalities occurred between January 1999 and June 2000.

In 1992, no fatalities were reported. In 1993 there were five deaths. In 1994 and in 1995 there were three fatalities in each year. In 1996 six people died, the same number as in 1997. In 1998 fifteen drug-related deaths were reported. In 1999 three fatalities were confirmed and seven more were reported in the first six months of 2000. The year of death has not been identified for two users.

The fatalities reported by the police (regardless of whether the deceased was known to an addiction service or not) for the district of Thessaloniki were nine in 1992, four in 1993, twenty one in 1994, eighteen in 1995, twenty five in 1996, thirty eight in 1997 and thirty eight in 1998. In the 1999 NCDIDA report (NCDIDA 2000), 31 fatalities were reported in the same area (234 in the rest of the country).

Ten cases had made first contact with our Services in 1992, twelve in 1993, six in 1994, three in 1995, three in 1996, five in 1997, six in 1998, four in 1999 and one in 2000. Forty-four fatalities were males and six were females. The mean number of years of use before death was 12.9 years. The mean age of the deceased was 30.4 years.

The Hepatitis C and/or HIV status of 19 of the drug-related death cases was known. Fourteen had tested positive for Hepatitis C, three were negative and two had not been tested for Hepatitis C. None had tested positive for HIV.

Three of the deceased had completed the Therapeutic Community programme in the past, one was still attending (was on leave) and another ten had dropped out from the same programme. Five individuals had completed the detoxification ward programme (the ward opened in December 1995), whereas three failed to do so. Twenty-seven had made contact and were seen, at least once, at the Counselling and Information Centre and one was

attending the programme of another non-NHS Therapeutic Community at the time of death.

In 46 cases the cause of death was identified by the forensic department. Forty-one fatalities were due to probable accidental overdoses, and one (male) due to suicide. Four cases were due to accidents (three of which were traffic accidents) and four due to drug-related physical illnesses. The main drug of abuse (as known to our Services) was heroin: (exclusively or with other substances) it was implicated in all the fatalities.

Discussion

Collecting data on DRDs in Greece – especially locally - is not an easy task. The periodical and annual reports of the police are usually summative (numbers of fatalities without names) and therefore the identification of the victims requires daily collection of information from the press or other media. The latter has been our main source of information. Other sources of information were relatives and friends of the deceased, and informal information from forensic sources and other addiction services. Every possible measure was taken in order to check and confirm the incoming information.

In Northern Greece major treatment services include OKANA's methadone outpatient treatment programme, the Ithaka therapeutic community, and the addiction services of the Psychiatric Hospital of Thessaloniki. A group of addicts might have attended two or three of these services. There is still a lack of detailed information about this group shared among the services, and therefore some deaths might be identified by one service but not by another.

It appears that drug-related deaths in Greece are greatly under-reported. The Greek police usually publish reports only on deaths due to overdose. The forensic verdicts may implicate drug use as the direct cause of death or may report other causes. There is scarce information on both drug-related accidents and on fatalities due to physical and psychiatric problems (which were either caused or were aggravated by drug use). All these factors, along with several methodological and other practical problems make an accurate estimation of drug-related mortality a very difficult task. A rough estimate of the fatalities of people who had applied for help to our Services might be at least twice of that reported. Also according to sources at the Forensic Science Department of the Aristotelian University of Thessaloniki, the actual number of drug-related deaths in Northern Greece may be two- or three-fold the official number.

Approximately one-fifth (31) of the total 153 deaths due to fatal overdoses in the district of Thessaloniki between 1992-1998 (as reported by the police) were possibly known to our Services. However, lack of essential information does not allow further comments.

The main drug of abuse and the drug implicated in death was heroin (very similar to the national data) (NCDIDA 1999).

It appears that addicts who had merely contacted our Services but failed to engage in treatment were more likely to suffer a drug-related death (27 fatalities) than addicts who had started or completed all stages of the programme (three fatalities in the latter category). This generally agrees with data from the international literature (Davoli *et al* 1993).

A considerable number (approximately one-fifth of the total number) of fatalities were attributed to reasons other than overdoses. This observation supports the view that the actual drug-related mortality is higher than the officially reported one.

Conclusion

Data from our Services in Thessaloniki agree with nationally reported ones on the generally increasing trend of drug-related deaths. It appears that the actual number of deaths may be much higher than the officially reported one. The evaluation of drug-related mortality is a difficult task both in Greece and elsewhere (NCDIDA 1999). A more accurate evaluation of the problem requires a more efficient and reliable data collection system, that would include both direct and indirect drug-related fatalities. The Addiction Services also need to look at more efficient methods of communication and information sharing. Meeting these requirements can lead to a better understanding of the problem and to more efficient prevention strategies.

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Chapter 8 Drug-related mortality in Italy

L Tidone, M Campana, M Riglietta and A Zucchi

Summary

We describe national data on drug-related mortality and the processes of collecting information.

Drug-related deaths increased in Italy from 1987 to 1991 (543 to 1383). The significant decrease observed from 1991 to 1994 (from 1383 to 867), is perhaps related to a new law that does not make autopsy compulsory in every case in which a drug-related death is suspected. The rate seems to be increasing in the last few years. It is difficult to consider how reliable these official data are due to the illegality and complexity of the phenomenon.

We describe a new method to preview the probability of drug-related deaths in a geographic area, based on GIS (Geographic Information Systems). Then we try to find a correlation between mortality rate and regional availability of substitution treatments. Methadone Maintenance Therapy (MMT) seems to be protective, as was demonstrated in the case of the spread of HIV.

Si riportano i dati nazionali relativi alla mortalità direttamente correlata all'uso di sostanze illegali e si descrivono le procedure di notifica attualmente in vigore.

I decessi in Italia hanno visto un incremento annuale dal 1987 al 1991 (da 543 a 1383). Dal 1991 al 1994 si è registrata una significativa diminuzione (da 1383 a 867), correlabile, probabilmente, ad una modifica della normativa che non prevedeva più l'obbligatorietà dell'autopsia in caso di morte sospetta. Il tasso sembra essere attualmente in crescita. Difficile, tuttavia, vista l'illegalità del fenomeno e la complessità delle rilevazioni, considerare attendibile e significativo il dato ufficiale. Viene descritto un metodo di stima per la probabilità di morte da overdose in un territorio, basato sull'analisi spaziale GIS (Geographic Information Systems).

Infine si tenta una correlazione tra tasso di mortalità in un territorio e la disponibilità di trattamenti sostitutivi. Il trattamento sostitutivo sembra essere protettivo, come, secondo quanto già dimostrato, nei confronti della diffusione dell'infezione da HIV.

Introduction

We have divided this chapter into two sections. In Section 1 we present the national data, the process of collecting data for drug-related mortality, and a study looking at the relationship between mortality and the efficacy of

Methadone Maintenance Treatment (MMT). In Section 2 we describe a new epidemiological approach to these kinds of problems.

Section 1 National data

Table 8.1 gives the total number of patients treated by public and private drug addiction centres in 1997. Private services considered are only therapeutic communities, just for residential programmes. The total number of patients in private centres is in parenthesis.

Table 8.1. National data on drugs, Italy

Variable	Total	Male	Female	Ratio (M/F)
General population 1997	57,512,615	27,967,670	29,644,945	0.94:1
Drug addicts in treatment 1997	138,218 (17,385)	118,834 (15,236)	19,384 (2,149)	6:1
Annual rate for drug-related deaths/100,000 inhabitants.	0.068	0.061	0.007	8:1

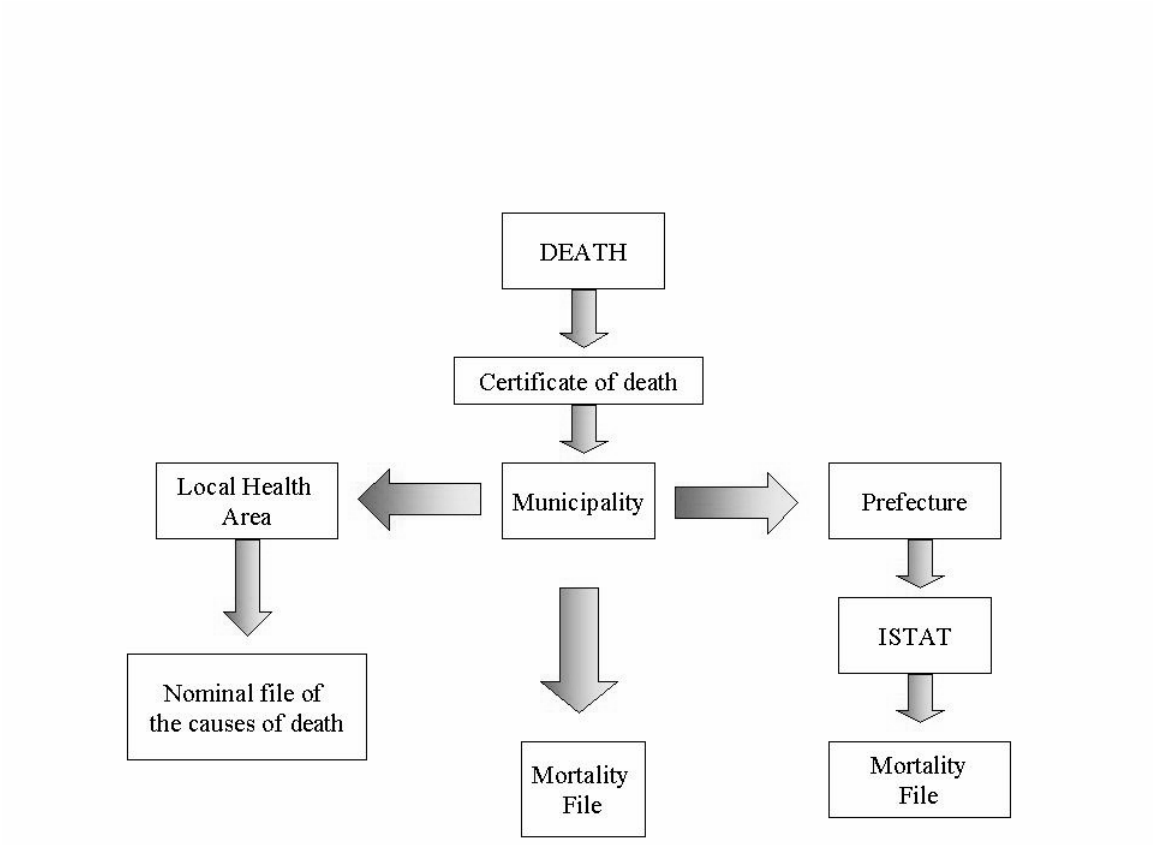
Collection of drug-related death data

Mortality data are collected by ISTAT (Instituto Nazionale di Statistica), which is the national institute for statistics. ISTAT collects data on the general population on a variety of topics from economics to the environment, health care and other kinds of information that will help an understanding of the quality of life in Italy. Drug-related mortality is defined variously in different situations: drug-related mortality directly connected to drug use, legal or illegal (i.e. overdose) and drug-related mortality indirectly associated with drug use (i.e. HIV infection, hepatitis, road traffic accidents). A drug-related death case is considered as one caused directly by an overdose from a legal or illegal substance (De Giovanni *et al* 1998).

The law states that the Medical Practitioner who verifies the death of the patient within 24 hours is legally obliged to determine the cause of death to the Mayor, (Regio Decreto No. 1238, 9/7/1939; DPR No. 803, 21/10/1975). The certificate of death must be presented by using the appropriate form which is the same in all of the Italian territories. This form was drawn up by the Minister of Health and ISTAT. The form can only be filled in by a Public Health physician if the person is not known to be receiving any prescription. When a violent death occurs the doctor can then fill in the death certificate if he/she is able to diagnose the cause of death by looking at the body and explain the circumstances in which it is found. However, if the doctor is not able to diagnose the cause of death, he/she is obliged to inform a Judge who

can order an autopsy (Barni 1974, Ricciotti 1989, Ricci and Venditto 1999). The form is completed in duplicate: the first copy is sent to the Prefecture which then sends it to ISTAT; the second copy is sent to the Local Health Unit where the death occurred. According to law (DPR 803/75) the Municipality must open a file on the death certificate (Figure 8.1).

Figure 8.1. Causes of death flow chart for Italy



The ISTAT form is divided in two separate parts (Figure 8.2):

Part 1 contains clinical information and is compiled by the doctor certifying the death.

The first section distinguishes between natural and violent causes of death. If the death occurred by natural causes it is necessary to indicate:

- Initial cause (the disease which brought to the final state)
- Intermediate cause or complication
- Final cause i.e. the disease directly related to the death. However it is necessary to indicate other factors which contributed to the death.

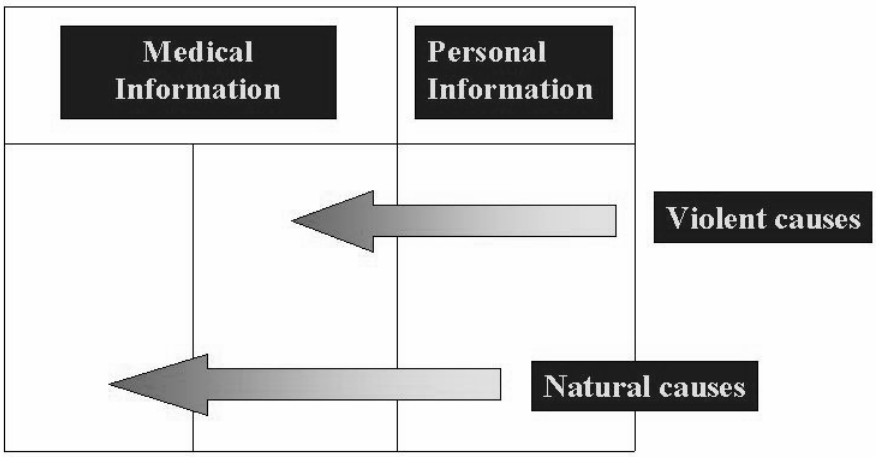
If a violent death occurred it is necessary to indicate the situation in which the death occurred by using the following categories:

- Accidental
- Accident at work
- Suicide
- Homicide

Moreover, attention is focused on a description of the injury, disease and its eventual complications, precedent diseases which could have contributed to the cause of death and the way the injury was inflicted.

Finally, the date on which the accident occurred has to be reported as well as the interval between the initial event and the final cause of death and the place of death.

Figure 8.2. ISTAT form



Part 2 contains personal data and is compiled by a public official of the Municipality.

The data collected are: date of death, date of birth, birthplace, age at the moment of the death, civil status, address, education degree, job and citizenship.

The recent law “Settlement of Mortuary Inspector” (D.P.R. No. 285/1990) formally defines the flow of data. The ISTAT form is compiled in two copies: one copy must be sent, within 30 days, by the municipality to the Local Health Unit where the person died, another is sent to the Local Health Unit where the person resided. The aim of this complicated data flow is to record both civil and medical information in order to have a correct registration for civil and medical purposes.

The essential data that must be given are:

1) Personal information: the code reported on the death certificate, name, surname, address, date of birth, date of death and place of death.
2) Medical information. It is mandatory to include cause of death and, in the case of violent death, the way in which the injury was caused and specify if the death is included in one of the four categories mentioned above: accident, accident at work, suicide, homicide.

Mortality data and drug-related deaths

Before 1990, in all cases with a possible aetiology of drug-related death or where there was any uncertainty the judge ordered an autopsy and a toxicological analysis of drugs from biological fluids and tissues was routinely done (Ruotolo and Ruotolo 1999).

The magistracy has never considered this procedure useful in identifying the guilty individual. The cost of this procedure was very high and it was in contrast with the steady reduction of the Welfare State budget.

Currently, the diagnosis is based only on a superficial examination and on information collected from relatives and friends. For this reason it is impossible to have an accurate diagnosis about drug-related deaths and to compile detailed analysis of the drugs involved in the death (i.e. legal or illegal substances).

The relationship between drug-related mortality rates and MMT

For this study we used data collected by Ministry of the Interior (Ministero dell' Interno 1987-1997). Drug-related deaths in Italy during the first half of 1997 were 540. We presume that the total for the full year will be about 1100.

These data include only directly drug-related deaths (i.e. overdoses) and exclude those in which drugs were involved as a contributory cause (i.e. cirrhosis, road traffic accident, suicide).

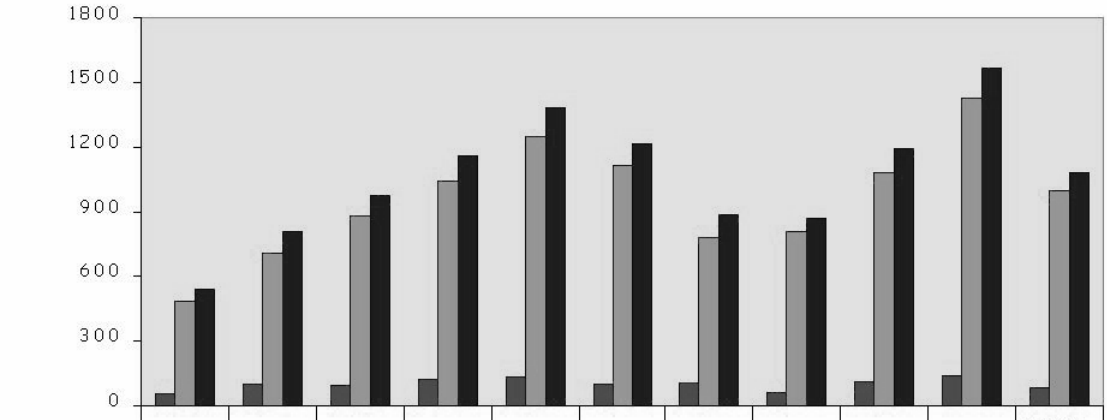
During the first 6 months of 1997 (540) there was a decrease of one-third compared with the same period in 1996 (810).

From 1987 to 1995 the highest number of deaths was accounted for by those aged 25-29 years, from 1996 to 1997 the leading age group was 30-34 (Figure 8.3).
The Region that had the highest number was Lombardy (Milan) with 275 deaths in 1996, followed by Lazio (Rome) with 220.

During the first half of 1997, Lazio had 82 deaths, followed Lombardy (70). Lombardy had a great decrease (87 less in the first half of 1997 compared to the same period in 1996).

Substances involved were heroin (236), cocaine (8), and other drugs (244).

Figure 8.3. Total drug overdose deaths by gender, Italy, 1987-1997



	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	prevew 1997
female	57	99	92	120	136	100	107	61	113	137	84
male	486	710	882	1041	1247	1117	781	806	1082	1427	996
total	543	809	974	1161	1383	1217	888	867	1195	1564	1080

The cities that had the highest number of deaths were Rome (68), Naples (54), Turin (45), Florence (20), and Bologna (19), but if we consider the deaths/inhabitants ratio in the 83 Italian provinces, in first position is Reggio Emilia (1/39,510) and in last position Messina (1/682,476). Bergamo is in 79th position (1/235,819), and Milan in 34th (1/103,561).

If we compare two small cities of northern Italy, Bergamo (120,000 inhabitants) and Reggio Emilia (139,000 inhabitants) we find that there is an inverse ratio between deaths and MMT. In fact during the first half of 1997, 617 were in the MMT programme in Bergamo province and 103 in Reggio Emilia province.

Conclusion

The most important methodological problem facing us is the need for correct data about this kind of death. There are a lot of elements that can influence the official statistics:

- Lack of personal information
- Social and psychological influence on the medical examiner
- The magistracy has the power to decide whether or not certain information should be withheld

The negative consideration of drug addiction can lead to an under-estimation of the phenomenon. From the medical point of view, it is important to have correct data regarding the substances involved in the cause of death. Only with the provision of correct data is it possible to carry out the appropriate therapeutic interventions. For example the procedures for fighting "designer drugs" and heroin/cocaine are completely different. On the other hand, one must take into consideration the financial implications when making choices: whether to spend more money on the therapeutic programmes or to spend more money as a consequence of a lack of such programme. For this reason it is better for us to draw up a specific study rather than an expensive routine. However, on the basis of this data, we can suggest a correlation between mortality and availability of MMT, as well as the correlation demonstrated between MMT and HIV diffusion.

Section 2 A spatial analysis-based approach for estimating overdose mortality

(This section is based upon a study by A Zucchi, C Tasco, R Guaiana and R Buzzetti.)

Introduction

Public health practice needs thorough information on the course of disease and other health events to implement appropriate actions. Most epidemiological data have a location reference, and knowledge of the new information offered by spatial analyses will increase the potential for public health action. Geographic information systems (GIS) are an innovative technology ideal for generating this type of information. GIS are "automated systems for the capture, storage, retrieval, analysis, and display of spatial data" (Goodchild 1992, Clarke 1995, Clarke *et al* 1996). GIS has emerged as an innovative and important component of many projects in public health and

epidemiology, particularly regarding surveillance and monitoring of vector-borne diseases, water borne diseases, in environmental health, and the analysis of disease policy and planning (Gesler 1986).

Epidemiology is classically described as the "study of the occurrence of diseases in a population domain or in groups of individuals" (Miettinen 1985). The application of the epidemiological techniques to a geographical domain could be expressed as the "study of the occurrence of health events in a population according to a determined spatial division (political boundary, administrative, meteorological, etc.)" (Cuzick 1992). Spatial variation in health-related data is a well-known phenomenon, and its study is a fundamental aspect of epidemiology. Epidemiologists have traditionally used maps when analysing associations between location, environment, and disease (Cliff and Haggett 1988, Clarke *et al* 1991, Richards 1993, Beck *et al* 1994, Braddock *et al* 1994, Gruppo ESEDRA 1997). GIS are particularly well suited for studying these as well as previously quoted associations because of its spatial analysis and display capabilities. Fundamentally, the purpose of medical geography is to get an efficient information system derived from the obtained health indicators (e.g., mortality and morbidity) and from geographical proximity (McGlashan 1972, Mayer 1993, Marchi and Biggeri 1995).

Mapping Mortality Data

The interpretation of geographical mortality data analysis involves the definition of at least four main items (Silverman 1986, Cislaghi *et al* 1990, Selvin 1991, Smans and Esteve 1992, Tasco 1993, Luppi *et al* 1995, Cislaghi *et al* 1995a, Alexander and Boyle 1996).

- Randomness in difference between the estimated rates in different areas;
- Definition of higher- or lower-risk areas;
- Assessment of clustered cases of pathology ("detection of cluster"), a local excess number of disease cases around a suspected or a priori recognised source of factor of risk (i.e. a thermoelectric power plant, a factory with polluting emissions);
- Assessment of a particular spatial aggregation ("clustering"), in the distribution of disease cases of a definite area, a more heterogeneous "clumped" distribution than expected from variation in population density and chance fluctuations.

The analytical techniques just described require the pooling of information in administrative areas with well defined geographic boundaries (e.g., counties, municipalities, and health districts), and represent the spatial process with maps constrained to them (Mrela *et al* 1998). As a matter of fact, these maps are sometimes unable to capture health problems at the locality or sub-county level. It is also known that epidemiological variables do not necessarily recognise political boundaries. Surface and contour pattern analysis presents an alternative, to overcome this limitation, by representing the distribution of the health event as a continuous process throughout the region. That is, a health event is assumed to be a continuous process observed at a set of

geographic points, known as “sampling points”. Using the x and y co-ordinates of these sampling points, with an associated z value corresponding to the health event, the estimated spatial relative risk is depicted as a three-dimensional map or surface. The contour map, known as an isoline or “isopleth”, is the projection of the surface in a plane, and corresponds to constant z values of the defined surface. In the case of mortality data, isopleth is defined as “isothanat”.

The maps shown here adopt estimates of the density functions via Kernel estimators applied to SPMR (“Kernel of Standardised Proportional Mortality Ratio”, or KPSMR) (Richardson 1991, Luppi *et al* 1995). This is a statistical technique whereby, in epidemiological applications, a distribution of discrete points or ‘events’ representing incidence of disease is transformed into a continuous surface of disease risk. Essentially, a moving three-dimensional function (the kernel) of a given radius or ‘bandwidth’ (also known as “circular window”) ‘visits’, starting form a central point known as “centroid”, each of the points or events in turn, and weighs the area surrounding the point proportionately to its distance to the event. The sum of these individual kernels is then calculated for the study region, and a smoothed surface produced. The aggregative component of the data is thus underlined. Moreover, kernel indicators allow the estimation of a point value also as a function of nearby values. It is suggestive of the fact that a single area risk value (i.e., a single municipality) is influenced by existing risks in the bordering areas. Kernel indicators allow a readable identification of the clustering component (McGlashan *et al* 1978, Blot *et al* 1979, Bithell, Richardson 1991, Mayer et al 1993).

Spatial analysis of overdose mortality in Lombardy and neighbouring areas, Italy: an example

The data concern deaths that occurred in the period 1987-1989 in 2843 municipalities included within a radius of 150 km from the centroid, located in the city of Rovato (Province of Brescia, Lombardy). The project evaluated 14,925,838 residents. Demographic data used were those reported by the 1991 National Census, used as standard population to build mortality comparison indexes. The analyses concerned ages ranging from 15 to 44 years since these ages were representative of more than 95% of total deaths in the dataset. Deaths were considered as “drug-related” according to the ICD-9 codes shown in Table 8.2. Essentially, all psychotic or non-psychotic drug abuse-related cases are included (Benson and Holmberg 1984, Tasco 1993, Marx *et al* 1994, Cislaghi *et al* 1995c, Bernardinelli *et al* 1995, Cislaghi 1998, Ghodse *et al* 1998, Kallan 1998).

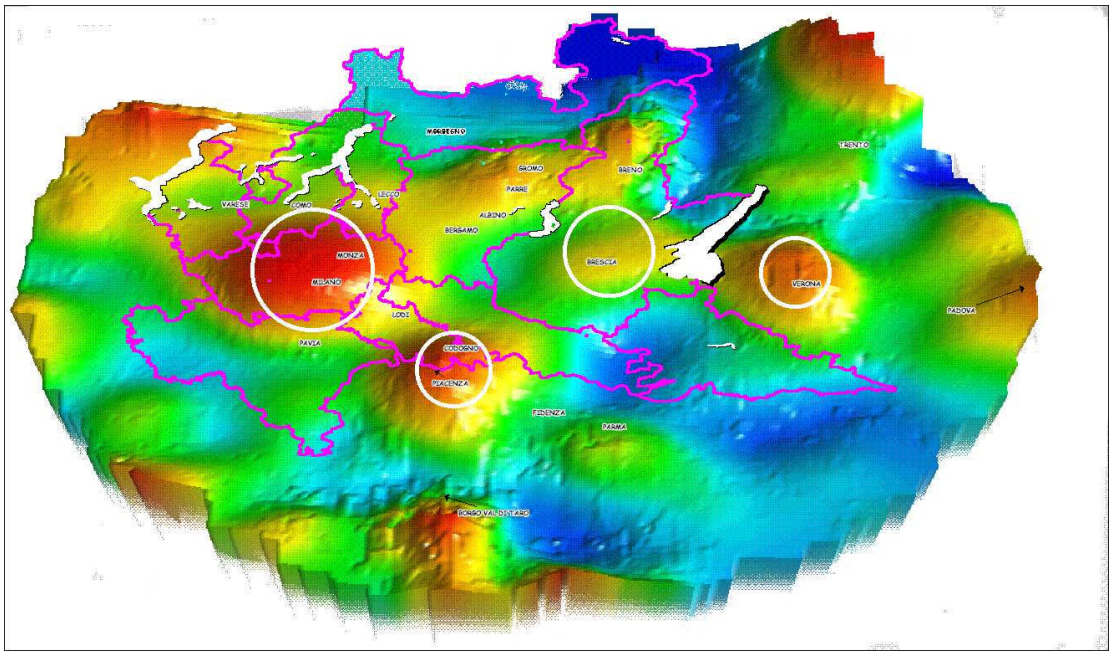
Table 8.2. Drug-related mortality ICD-9 codes used in Italian study

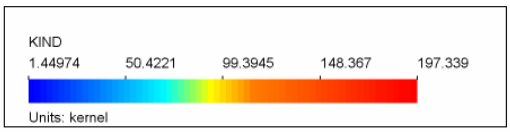
	Drug type			
	Cocaine	Morphine	Barbiturates, Tranquillisers and	Others

	Psychotropic substances			
Drug dependence and/or drug abuse	304.2, 305.6	304.0, 304.7, 305.5	292.1, 304.1, 304.3-304.5, 304.8, 305.2-305.4, 305.7-305.8	292.0, 292.2, 292.8-292.9, 304.6, 304.9, 305.9, 965

Spatial analyses concerned a “bandwidth” of a given radius set equal to 150 km. The centroid was set in the municipality of Rovato (province of Brescia, Lombardy), to minimise the areas lying outside administrative boundaries of the Lombardy Region. The kernel procedure smoothed standardised proportional mortality ratios (SPMRs), instead of simple Standard Mortality Ratios (SMRs), to minimise possible coding errors (Cislaghi *et al* 1990, Bithell 1990, Luppi *et al* 1995). A cluster was detected when a municipality value of KSPMR was higher than KSPMRs of the 12 neighbouring municipalities (Bithell 1990, English 1992, Luppi *et al* 1995). A z test is then performed to test the casualty of the cluster located, where the probability level is set to z = 1.64, for $p<0.05$. On the maps (Figures 8.5 and 8.5), clusters are represented by white circles, whose radii coincide with the cluster kilometric radius. Maps are visualised by means of a 3D rectangular interpolation of the Relative Risk Surface (defined as “KIND”) using MapInfo Professional 4.5 (MapInfo Corporation, New York 1998).

Figure 8.4. 3D Visualisation of the Relative Risk Surface of male overdose mortality, Lombardy 1987-1989





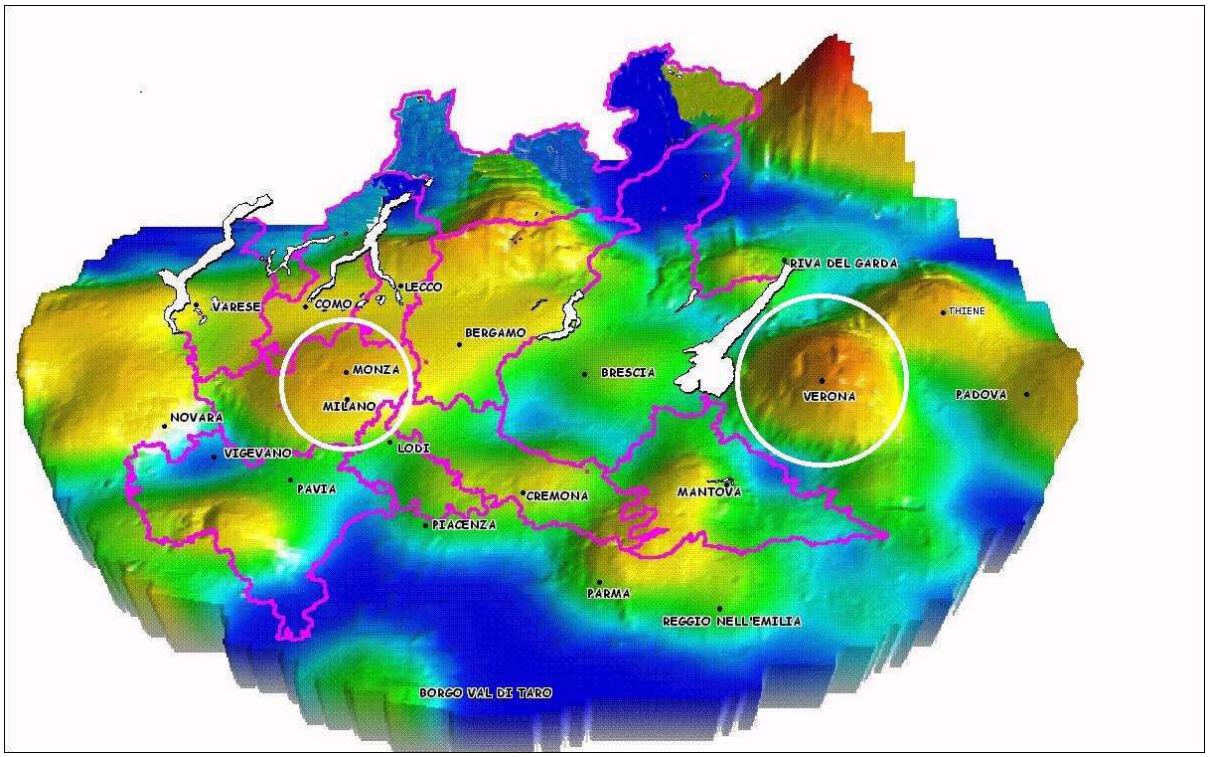
Stastically significant clusters are represented by white circles. The colorimetric scale ranges from deep blue (lower risks) to bright red (higher risks). See box for absolute values.

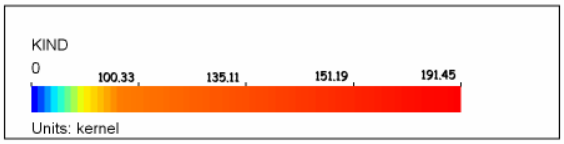
The following clusters in Lombardy were detected for males:

- Brescia - total deaths observed 67, total expected 54; global cluster index (GCI): 122; 32 municipalities in the cluster area; cluster radius 13.28 km.
- Piacenza - observed 45, expected 25; GCI: 179; 28 municipalities; radius 15.75 km.
- Milan - observed 912, expected 529; GCI: 172; 231 municipalities; radius 30.00 km.

Other clusters outside Lombardy were detected at Verona and Tezze sul Brenta (both in Regione Veneto) and Parma (Regione Emilia-Romagna).

Figure 8.5. 3D Visualisation of the Relative Risk Surface of female overdose mortality, Lombardy, 1987-1989





Stastically significant clusters are represented by white circles. The colorimetric scale ranges from deep blue (lower risks) to bright red (higher risks). See box for absolute values.

Only one cluster in Lombardy was detected for females:

- Milan - total deaths observed 89, total expected 38; global cluster index (GCI): 234; 77 municipalities in the cluster area; cluster radius 17.95 km.

Outside Lombardy only one cluster was detected at Verona, confirming the observation for males.

Discussion

Our analyses clearly show that "overdose mortality" is, on average, a strictly urban phenomenon (Benson and Holmberg 1984, Tasco 1993, Marx *et al* 1994, Ghodse *et al* 1998, Kallan 1998). It was possible to identify some rural areas where only anecdotal rumours suggested that drug-related deaths were a strong risk factor for local youth. But non-random spatial patterns of deaths do not unequivocally identify specific causes or alarms. Such factors as differential smoking habits, and socio-economic differences are known examples of possible explanations of observed spatial patterns. Analyses pointing out non-random spatial patterns, based on density-equalised or geopolitical maps, are subject to the same limitations in interpretations as most pair-wise associations.

What advantages does the methodological tool described here give, if compared to the "classical" epidemiological studies of mortality? In short, the following benefits are provided by spatial analysis:

- An immediate comparison between the area of interest and nearby areas, that is easy to understand, even by laymen
- An objective "reading" of the disease strength distribution on the territory, such as the recognition of a possible "risk-pattern" underlying;
- A simpler individualisation of "hot-spots" where preventative interventions can be initiated
- A more complete "reading" of the area, when a kernel map is crossed with other maps concerning some territorial risk (i.e., "pushers' " trading areas or points, if known)
- An overcoming of inherent limits of statistical indeterminateness (i.e. the use of inaccurate estimators in the presence of demographic areas whose burden of events is limited)

The strongest element of these approaches as a tool of knowledge and guide for successive interventions is the possibility of using the maps either for territorial surveillance, or to identify peculiar spatial organisations. They allow the exploitation of the available information in order to estimate the level of existing risk in each of the elementary areas analysed. This is also feasible with other techniques (trend surface methods, Bayesian and empirical Bayesian methods (Cislaghi *et al* 1995b)), but the risk surface density estimation method requires less statistical constraints (Blot *et al* 1979, Bithell 1990, Richardson 1991, Cuzick 1992, Luppi *et al* 1995) (e.g., the form of an *a priori* probability distribution of relative risks).

Finally, although remarking that the application of these techniques is devoted to the cognitive exploration of a phenomenon, and not to check specific hypotheses, we have to note that it approaches the ultimate object of descriptive epidemiology: the building of a "geography of the damage", that should permit the hypothesis of a "geography of risk". The "geography of mortality" can therefore help to locate the risk factors. On the other hand, it has to be well remembered that risk factors are of different nature, and that their recognition generally is far than easy. The "geography of risk", therefore,

still remains a hugely interpretative fact; the tool demonstrated here, however, allows one to compare the damage distribution to that of the investigated risk more rigorously, when the latter is sufficiently known, and spatially distributed.

The results from our analysis of overdose mortality are debatable, partly owing to the lack of quality of the death certification system, as already discussed. This problem is not easily solvable, even if analyses are in progress concerning more flexible data estimation models in relation to aggregation/disaggregation of single events. As in this case, if it is not feasible to use any of the aforesaid models, it appears obvious to emphasise the heuristic and descriptive role of this technique.

Readers should be warned that, if used naively, carrying out small-area analyses using routine data in order to detect areas at high risk could be potentially dangerous, because some spuriously positive results could occur solely by chance. These analyses require great care, particularly before publicly announcing results; moreover, they should be replicated in at least two independent time intervals. GIS applications show the power and potential of such systems for addressing important health issues at the international, national, and local levels. Much of that power stems from the systems' spatial analysis capabilities, which allow users to examine and display health data in new and highly effective ways. GIS and spatial analyses, producing objective representation and identification of spatial patterns, may play an important role in the use and analysis of public health data, providing sound evidence for the formulation of public health policies (Bailey and Gatrell 1995, Morgenstern 1998).

However, turning the promise into reality entails a multidisciplinary effort to explore the possibilities offered by spatial and temporal analytical techniques to improve our knowledge of public health. GIS can be seen as a new approach to human diseases science, but if the words “spatial analysis” refer to the “ability to manipulate spatial data into different forms and extract additional meaning as a result” (Bailey and Gatrell 1995), these techniques do not fit neatly into the public health operator's toolbox. The issue of reliability and validity of the data is of utmost importance, too. It requires rethinking and reorganising the way that data are collected, used, and displayed. It requires expense, training, and a steep learning curve. It needs maintenance and support and can be both overwhelming and threatening to the uninitiated. A first step would be to integrate instruction on GIS into curricula in public health studies. A second step would be to seek out more formal links between the research communities working with GIS (Bailey and Gatrell 1995, Morgenstern 1998, Yasnoff and Sondik 1999).

Lastly, we consider the knowledge of these tools to be worthwhile for public health researchers, drug abuse epidemiologists, and any else involved in health care organisation, not only as an effective mean to derive aetiological hypotheses, but as a fundamental basis for public health planning and resource allocation.

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Chapter 9 Drug-related mortality in Lithuania

R Kalediene

Summary

The aim of the study was to analyse the problem of drug dependence and drug-related mortality in Lithuania. Information about the prevalence and profile of drug dependence was obtained from the State Mental Health Centre. Numbers of cases of death due to drug dependence and addiction were available from the computerised database of the Lithuanian Department of Statistics. The number of documented drug addicts has been increasing gradually. There were 3,082 registered drug addicts in 1999 (83.3 per 100,000 population). The most common were opiate users, accounting for 71.6% of all documented cases. Official statistics, however, do not fully reflect the realistic situation in Lithuania. According to official mortality statistics, cases of drug dependence and addiction were increasingly registered as an underlying cause of death from 1990. The majority of these deaths occurred at age 25-39. Mortality from acute intoxication by drugs has been increasing as well. Legal psychoactive drugs accounted for 90.6% of such deaths in 1995. In 1998 an overdose of psychoactive drugs was the cause of death in 55.3%, while overdoses from opiates accounted for 25.5% of the cases. A strategy for controlling the growing problem of drug dependence and drug-related mortality has been developed and some of these activities have already been initiated.

Šio darbo tikslas – išnagrinėti narkomanijos ir toksikomanijos problemą ir su narkotikais susijusį gyventojų mirtingumą Lietuvoje. Informacija apie narkomanijos paplitimą ir profilį buvo gauta iš Valstybinio psichikos sveikatos centro, duomenys apie mirtis nuo narkomanijos ir toksikomanijos – iš Lietuvos Statistikos departamento duomenų bazės. Oficialiai registruotų narkomanų skaičius Lietuvoje didėja. 1999 m. buvo registruoti 3082 narkomanai (83,3/ 100,000 gyventojų). Populiariausi buvo opiatai, nuo kurių priklausomi buvo 71,6 proc. visų registruotų narkomanų. Tačiau oficiali statistika neatspindi realios situacijos. Mirtingumas nuo narkomanijos bei toksikomanijos didėja. Didžiausias yra 25-39 metų gyventojų mirtingumas nuo šių priežasčių. Dažnėja ir ūmūs apsinuodijimai narkotikais bei psichoaktyviomis medžiagomis. 1995 m. 90,6 proc. ūmių apsinuodijimų įvyko dėl legalių psichoaktyvių medžiagų perdozavimo. 1998 m. padažnėjo mirtinų apsinuodijimų opiatais, kurie sudarė 25,5 proc. visų apsinuodijimų narkotinėmis medžiagomis, tuo tarpu apsinuodijimai legaliomis psichoaktyviomis medžiagomis nulėmė 55,3 proc. mirčių. Lietuvoje sukurta ir pradėta įgyvendinti narkotikų kontrolės strategija, kadangi ši problema tampa vis aktualesnė.

Introduction

For several decades, it was widely proclaimed by the Communist Party bureaucracy that there was no problem of drug addiction in the Soviet Union. Soviet officials prohibited publication of official data on this problem and such information was only available on a very restricted basis. Nevertheless, drug addiction did exist in Lithuania, as well as in other republics of the Soviet Union. The most commonly used narcotics were opiates, produced from poppies, and there were many cases of addiction to codeine and other sedatives. Drug addiction then was not a part of the youth culture; rather, it was mainly a problem concerning prisoners and persons released from prisons, and socially underprivileged people (Subata 1999).

Since the beginning of political and economic reforms in 1989, and after the collapse of the Soviet Union, Lithuania has experienced enormous social, political and economic changes in the process of shifting from being a Soviet republic to that of being an independent state with a newly-developing market economy. Circumstances in Lithuania have changed dramatically. The population of the country has been exposed to a new and unfamiliar social environment. Thus, people have been experiencing great stress as a result of the fundamental economic, political and social changes in the wake of Communism's downfall.

At the end of 1999, the population of Lithuania totalled 3,698,500 inhabitants with 68.2% living in towns and 31.8% in rural areas. There was a growth in the mortality rate at the beginning of the decade, however it has been declining over recent years. Compared with 1994, the mortality rate in 1998 decreased from 12.5 to 11.0 per 1,000 population. The population has been progressively ageing. The proportion of persons aged 60 years and over has constantly been increasing, and reached 18.2% of total population by the beginning of 1999 (Social trends in Lithuania 2000).

Due to its geographical location and developed network of roads, waterways, and air routes, Lithuania became a country for trade in transit. Consequently, excellent conditions for drug trafficking from Eastern to Western European countries and the Lithuanian black market developed. Lithuania was not prepared to cope with this situation. Appropriate legislation and technical equipment were lacking to properly institute control. Furthermore, the population lacked social immunity against drug use due to the dearth of such information. Drug addiction has been becoming a serious social problem with new kinds of drugs and psychotropic agents introduced into the black market. Young people started to adopt drug addiction as part of the so-called Western life style. In the context of such a situation, drug dependence and related mortality now require more attention.

The aim of this study was to analyse the problem of drug-related mortality in Lithuania.

Data collection on drug-related deaths

Information about the prevalence and the profile of drug dependence (numbers and demographic characteristics of drug addicts, the most common forms of drug dependence, and cases of deaths of officially registered drug addicts) was obtained from the State Mental Health Centre. This Centre is responsible for collecting and analysing all cases of documented drug dependence in Lithuania. Every person who contacts health professionals due to drug dependence is registered, using a standardised statistical form, which is entered into a computerised database. The Centre has been conducting statistical analysis for local, regional, and national levels since 1997. Up to that time, only sparse data on drug dependence had been available.

Information about cases of death due to drug dependence and addiction was obtained from the computerised database of the Lithuanian Department of Statistics. An analysis was made of all cases of death from 1990 to 1998 due to drug dependence and addiction, which is coded as 304 in ICD-9, and F11-F16, F18-F19 in ICD-10, applied for use in Lithuania since 1998 (WHO 1992). The mortality data were age-standardised, using the European standard population.

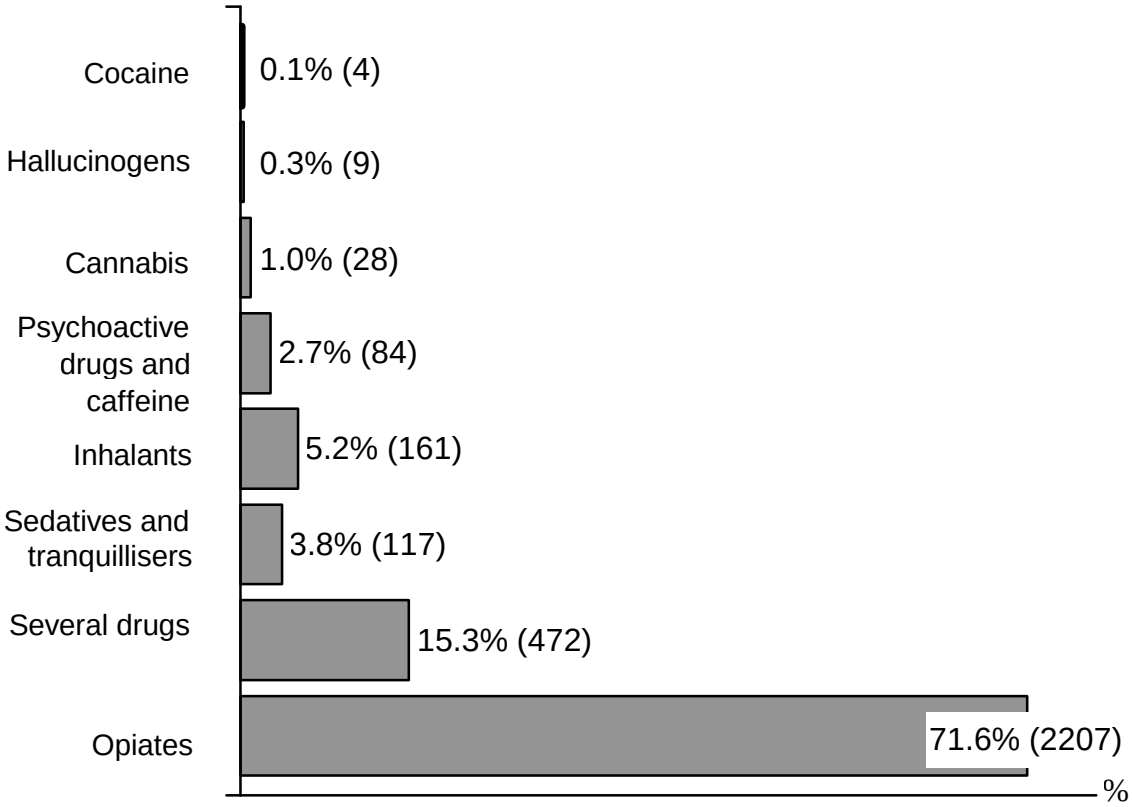
Expecting that some cases of drug-related deaths (DMDs) could be classified under the diagnosis of intoxication by drugs, groups of causes of death coded as 965, and 967-970 in ICD-9; and T40, T42, T43 in ICD-10 (cases of acute intoxication by drugs) were also reviewed. The data of official mortality statistics about acute intoxication by drugs were only available for 1993 - 1998, because of the changes in classifications of causes of death from the so-termed Soviet system to the International Classification of Diseases. The “Soviet” classification system, consisting of 175 categories, was used in Lithuania until 1993. It was not possible to identify the needed group of diagnoses from the shorter “Soviet” classification.

All other available sources of information, such as data from questionnaire surveys (The 1995 ESPAD Report 1997, Davidaviciene 1999) national reports about the social development of the country (Subata 1999, Social Trends in Lithuania 2000, Social Development and Living Environment of Lithuanian Population 1996) and the Lithuanian Health Programme 1997-2010 (1998) were used to collate the following information.

Results

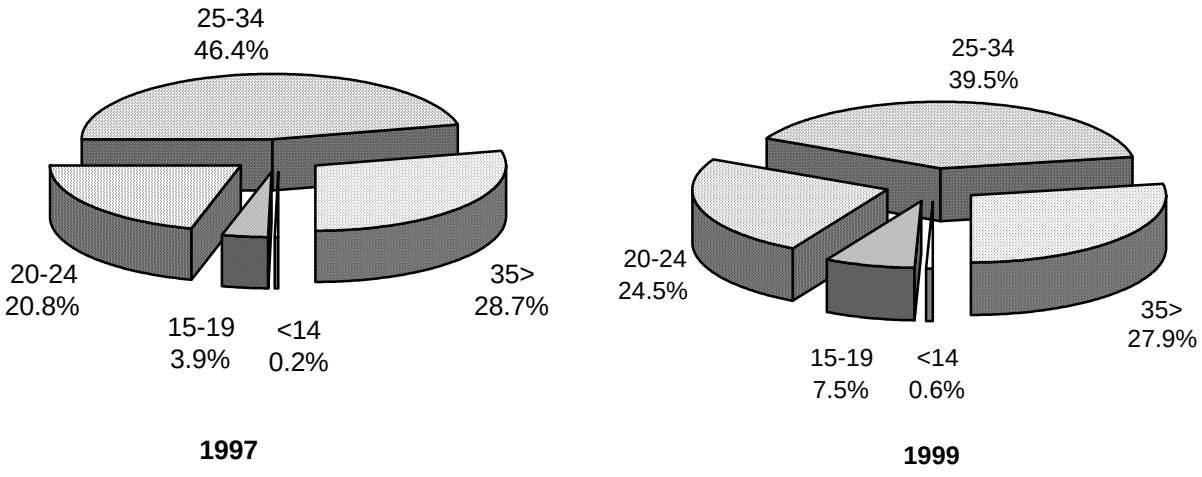
The number of documented drug addicts has been increasing gradually in Lithuania. There were 1,676 registered drug addicts in 1996; 2,871 in 1997 and 1998; and 3,082 in 1999. Prevalence of drug dependence was 83.3 per 100,000 population in 1999. Distribution of drug dependence by the type of substances used is presented in Figure 9.1, which demonstrates that the most popular were opiates, accounting for 71.6% of all documented cases.

Figure 9.1. Distribution of drug dependence by substances used in Lithuania, 1999



Most drug addicts were aged 25-34 years. In 1997, 46.4% of all drug addicts were in this age group, and 24.9% were under 25 years old. In 1999, the proportion of persons under 25 years old increased to 32.6% (Figure 9.2).

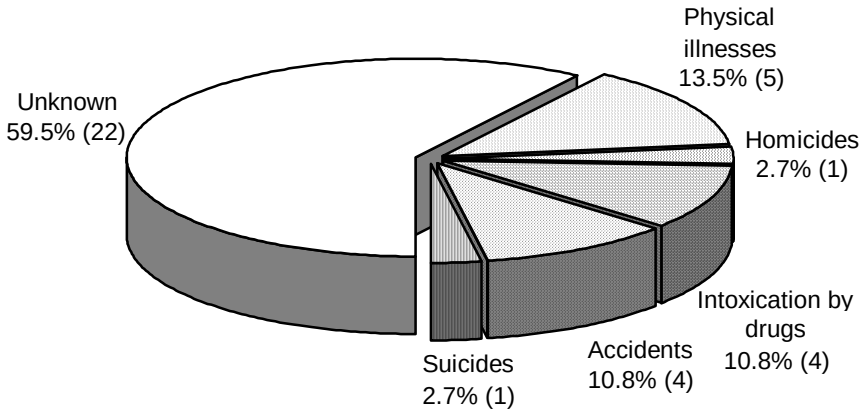
Figure 9.2. Distribution of drug addicts by age in Lithuania, 1997 and 1999



The demographics of all registered drug addicts in 1999 were that 80.9% were males, and 19.1% females; and 94.0% lived in towns. Most of them were concentrated in Vilnius, the capital city of Lithuania.

The number of registered deaths was 27 cases among known drug addicts in 1997, (a mortality rate of 10.1 per 1,000 drug addicts). Of these, 55.2% (16 cases) died due to physical illnesses, and 7.0% (2 cases) due to acute intoxication. The cause of death was unknown in only 1 case. In 1998, the number of deceased drug abusers reached 42 cases (a mortality rate of 14.6 per 1,000 drug addicts). This time the cause of death was unknown in 52.4%, of the cases; 16.7% died due to physical illnesses and not a single case of acute intoxication was reported. In 1999, mortality declined to 12.0 per 1,000 drug addicts. Causes of death among drug addicts in 1999 are presented in Figure 9.3. Of the 37 cases of death among registered drug addicts, the cause of death was unknown in 59.5% or 22 of the cases. In 13.5% or 5 of these cases, drug addicts died from physical illnesses; and in 10.8% or 4 of the cases, death was from intoxication by drugs.

Figure 9.3. Structure of causes of death of drug addicts in Lthuania, 1999



According to official mortality statistics, cases of drug dependence and addiction were increasingly registered as the underlying cause of death from 1990. Although in 1990, only one such case was registered in Lithuania, the number in 1997 had reached 34 cases (Table 9.1). The majority of these deaths occurred at age 25 - 39 years. The highest age-standardised mortality rate was observed in 1997 – 0.85 per 100,000 population.

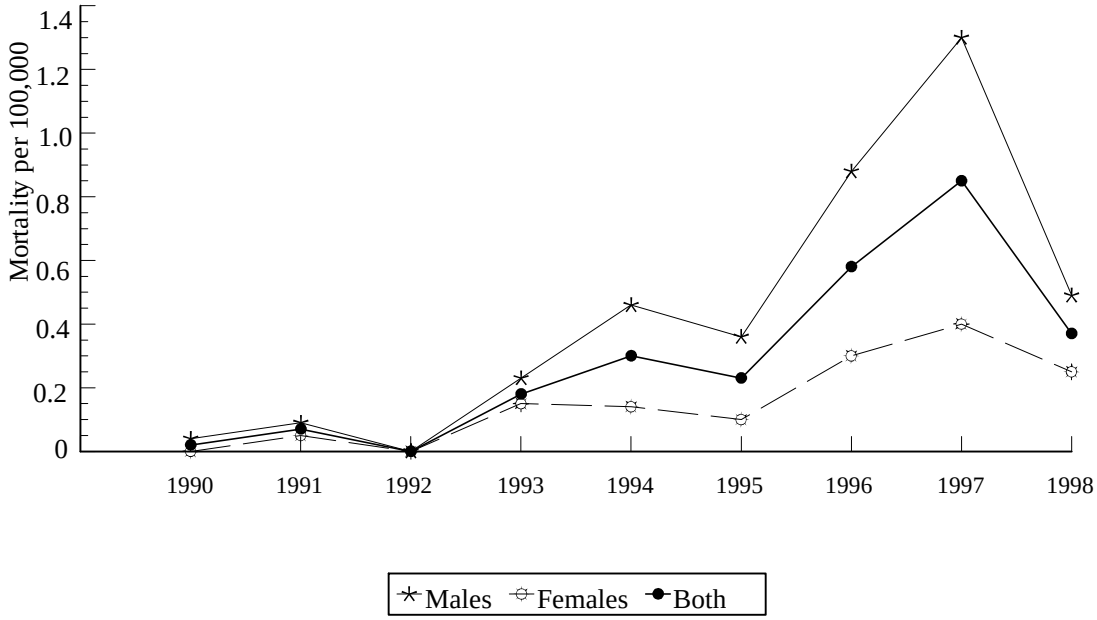
Age-standardised mortality from drug dependence and addiction was higher in males than in females throughout the entire period of investigation. The most considerable difference was noted in 1997, when the ratio of male/female mortality was 3.25. However, in both males and females, mortality from drug dependence and addiction was growing significantly since 1990, except for a decrease, noted in 1998 (see Figure 9.4).

Table 9.1. Cases of death from drug dependence and addiction in Lithuania, 1990-1998

Age	1990	1991	1992	1993	1994	1995	1996	1997	1998
10-14	0	0	0	0	0	0	0	0	0
15-19	0	0	0	0	1	0	1	1	0
20-24	0	0	0	0	0	0	3	5	2
25-29	1	2	0	2	3	2	6	8	2
30-34	0	1	0	1	5	2	6	8	2
35-39	0	0	0	3	2	4	4	9	4
40-44	0	0	0	0	1	1	1	1	1
45-49	0	0	0	0	0	0	0	2	3
50-54	0	0	0	1	0	0	1	0	0
55-59	0	0	0	0	0	0	0	0	0
60-64	0	0	0	0	0	0	0	0	0
65-69	0	0	0	0	0	0	1	0	0
70+	0	0	0	0	0	0	0	0	0
Total	1	3	0	7	12	9	23	34	14
Crude mortality rate per 100,000	0.03	0.08	0.00	0.19	0.32	0.24	0.62	0.92	0.38
Age-standardised mortality rate per 100,000	0.02	0.07	0.00	0.18	0.30	0.23	0.58	0.85	0.37

Mortality from acute intoxication by drugs as the underlying cause of death has been increasing since 1993, and reached its highest level in 1995 - 1.72 per 100,000 population (1.88 for males and 1.51 for females). Legal psychoactive drugs accounted for 90.6% of such deaths. Later, mortality began to decrease, and fell to 1.22 (1.63 for males and 0.82 for females) in 1998. An overdose of legal psychoactive drugs was the cause of death in 55.3% of the cases in 1998. These deaths were mainly from overdoses of sedatives and tranquillisers; and of these, an overdose of barbiturates accounted for one case. Overdoses from opiates accounted for 25.5% of the cases.

Figure 9.4. Age-standardised mortality from drug dependence and addiction in Lithuania, 1990-1998



Discussion and conclusion

Official data suggest that drug dependence and drug-related mortality rates are lower in Lithuania compared to many European countries. Official statistics, however, do not fully reflect the real situation in Lithuania. According to the Ministry of Internal Affairs, the total number of drug addicts should reach some 15,000; and the estimate according to the Vilnius Narcological Centre is 8,000 - 10,000 (Social Development and Living Environment of Lithuanian Population 1996).

Questionnaire surveys, conducted in Lithuania, have demonstrated that the most common age for first trying drugs is 18 - 20 years. Recently, an even younger age for beginning illicit drug use has become more prevalent. The !995 ESPAD study showed that, in Lithuania, only 3.4% of 15-16 year old boys and 2.7% of girls had experienced any sort of illicit drug use during their lifetime. The rate for this age group was considerably lower in comparison to other European countries (for example, in the United Kingdom, these figures reached 44% and 40%, respectively). Very few had reported use of marijuana or hashish, and this holds true also for any illicit drug other than cannabis (about 2%). Use of both inhalants and tranquillisers, or sedatives without doctor's prescriptions were indicated by about 15% of the Lithuanian students, which was higher than the average of about 9%. The use of alcohol together with pills was not as frequent in Lithuania as in many other countries. Only 2% reported this, compared to 9% on average (The 1995 ESPAD Report 1997). Nevertheless, more recent investigations demonstrated an increasing drug problem in Lithuania. In the repeated study of 1999, as many as 21.0% of the 15 - 16-year old boys and 9.6% of the girls reported experiences with illicit

drugs at least once in life. The most popular, as in many Western European countries, was marijuana or hashish (Davidaviciene 1999). Use of these drugs in 1999 reached the European average of 1995. At that time, addiction to legal psychoactive drugs was declining. Crime related to drug use is increasing. In 1996, there were 551 registered crimes related to the illegal drug trade. This was 7 times more than in 1990 (Lithuanian Health Program 1997-2010, 1998).

Our previous investigations demonstrated that official mortality statistics of Lithuania could be considered as being rather reliable (Kalediene 1992). Nevertheless, drug-related mortality is an exceptional case. Often, deaths from drug dependence and addiction fall into groups of internal or external causes of death; thereby a diagnosis of drug dependence disappears. Such a high number of deaths from unknown causes among drug addicts (59.5% of all cases in 1999) appears quite surprising. It became clear that this situation was mainly a result of the nature of the bureaucracy operating in the system. It seems that not all the local Mental Health Centres have copies of death certificates of their deceased patients, and simply do not know their cause of death, therefore this information is lost when sent from the local to the national level. Discrepancies between the numbers of intoxication by drugs as an underlying cause of death among drug addicts that are documented by the State Mental Health Centre (for example, no single case in 1998), and the official mortality statistics (14 cases of deaths from drug dependence and addiction in 1998) lead to an assumption that problems, related to the notification of drug addiction and registration of drug-related deaths, exist in the country.

Deaths from intoxication by drugs among drug addicts, who have not been registered could fall into groups, classified as acute intoxication by drugs. Intoxication by sedatives and tranquillisers could occur among persons other than drug addicts. However, it was not possible to make an accurate definition of the number of cases, wherein the deceased were drug addicts, based on the official mortality statistics. Decreasing mortality from acute intoxication by drugs in Lithuania is similar to the trends in many countries of the European Union, which could be associated with a decreasing use of intravenous forms of administration. The risk of an overdose from intravenous use is greater than from other forms of drugs. This data may be also associated with improved medical care. A study, analysing mortality among drug addicts in the United Kingdom during 1967-1993, reported that overall, opiates accounted for about 65% of drug-related deaths (Ghodse *et al* 1998). As opiates are the most popular drugs among registered drug addicts in Lithuania, it can be expected that they will become increasingly significant in drug-related mortality. The proportion of deaths due to legal psychoactive drugs has been decreasing in the country; nevertheless, it is still the most common form of intoxication from drugs.

Hepatitis C and human immuno deficiency virus (HIV) are serious health problems, suffered by drug addicts. During 1997-1999, the number of HIV infected drug addicts increased from 1 to 91, and this comprised 51.4% of the entire HIV infected population in the country. Of all persons having hepatitis in

the capital city of Vilnius, 19% were intravenous drug users (Subata 1999). This could become an increasingly significant factor in the mortality of drug addicts in the future.

Generally, mortality rates among drug addicts are known to be higher than those of the population at large (Engstrom *et al* 1991, Oppenheimer *et al* 1994). The small numbers and short period of investigation, however, do not permit any definitive conclusion for Lithuania. Extensive cohort follow-up studies are needed for confirming or rejecting this hypothesis.

Since 1993, the EC PHARE Programme against drugs for Eastern and Central European countries was started in Lithuania. In 1994, Lithuania joined the 1961 UN Convention of Drug Control, and the 1971 UN Convention of Control of Psychotropic Agents. In 1995, the Governmental Commission for Drug Control was established. In 1998, the Parliament ratified the 1988 Convention of Illegal Trade of Drugs and Psychotropic Agents. In 1998, the WHO Programme on Drug Abuse Prevention among Youth was started.

In the Lithuanian Health Programme (Lithuanian Health Program 1997-2010, 1998), it was stated that by the year 2010, drug demand should be reduced by 70% and drug supply by 80%. A strategy for achieving these targets has been developed, emphasising the following aspects:

- Intersectoral co-ordination, and establishment of intersectoral commissions at the municipalities of the largest cities
- Legislative background
- Implementation of UN international agreements
- International co-operation
- Development of a drug information system; establishment of a publishing and information centre, issuance of a special bulletin for information concerning drugs, and actions through the mass media.
- Prevention of drug addiction in secondary and high schools, and solutions of problems related to youth occupation and living without drugs within municipal preventive programmes
- Activities among persons from risk groups, especially in prisons, the army, and services of internal affairs
- Establishment and maintenance of close collaboration with non-governmental organisations
- Implementation of epidemiological and sociological investigations of drug use
- Training of specialists for treatment and rehabilitation of drug users
- Implementation of National Programme for Drug Prevention

Some of the activities have already been initiated, nevertheless, other social and health problems of the population are often considered as requiring priority attention. Only joint efforts by society at large, professionals, and politicians could prove effective in controlling the growing problem of drug dependence and addiction in Lithuania. This will be reflected in a reduction in drug-related death.

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Chapter 10 Drug-related mortality in Malta

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Summary

This paper compares the two major data sources of drug-related deaths (DRDs) in Malta - The Department of Health Information and the Police Drug Squad. The working definitions, data gathering and recording processes of these two units are outlined and their limitations explored. The data retrieved from these sources are also reported and their discrepancies discussed. It is asserted that the disparity in the number of DRDs reported between 1995 and 1998 by each data source is a result of the differences in case definition, data collection methods and information sources. Finally, this paper outlines the treatment of drug overdose on the Island and the prevention measures that are being undertaken to curb the incidence of drug-related deaths.

Dan l-istudju jezamina l-istatistika ta' l-imwiet minn drogi psikotropici migbura mid-Dipartiment ta' l-Informazzjoni dwar is-Sahha u l-Iskwadra tal-Pulizija kontra d-Drogi. L-awturi janalizzaw il-mod kif dawn l-entitajiet jigbru din l-informazzjoni, d-definizzjonijiet li qed jigu applikati f'dan is-settur u processi relatati. Din l-analizi tidentifika ghadd ta' diskrepanzi li jezistu f'dawn l-ghejjun ta' informazzjoni. Huwa sostnut li d-disparita' fin-numru ta' mwiet minn drogi psikotropici bejn l-1995 u l-1998 nnutati mill-entitajiet imsemmija fuq hija rizultat ta' problemi ta' definizzjoni, diskrepanzi f'sorsi primarji u metodi differenti ta' gbir ta' informazzjoni. L-awturi jaghtu hjiel ukoll tal-mod kif kazijiet ta' "overdose" jigu ttrattati u l-mizuri preventivi li qed jittiehdu biex ir-rata ta' mwiet mid-drogi tigi mrazzna.

Introduction

The Maltese archipelago, comprising of mainly three small islands, (Malta, Gozo and Comino) spans a total of 316 km^2 in the middle of the Mediterranean Sea. The archipelago's total population is about 378,000 with over 92% of the people living in Malta, the largest of the Islands (Abela 1998). Due to their strategic geo-political position, the Maltese Islands have played a pivotal role in the historical and political transformation of the region. Following its independence from Britain in 1964, Malta has attempted to manoeuvre its strategic location to build a tertiary service-oriented economy, spearheaded by an expanding tourist industry.

Rapid social change has also been closely aligned to the Islands' increased economic affluence, with the result that in spite of its essentially homogeneous and integrated socio-cultural milieu, Malta is now becoming an increasingly fertile ground for the surge of marginal lifestyles, often

characterised by illicit drug use. Although illicit drug use in Malta cannot be defined as an essentially contemporary social problem, relatively consistent increases in the reported number of opiate users accessing treatment services, the proliferation of synthetic drug use, and widespread media coverage of drug-related deaths have led to an intensification of public debate on the subject. Moreover, successive administrations have introduced a myriad of legislative, enforcement, preventive and treatment measures aimed at minimising and controlling drug use.

The setting up of the Agenzija ghall-Harsien mill-Abbuztad-Droga u l-Alkohol (Agency Against Drug and Alcohol Abuse) - *sedqa* - in June 1994 - a government agency providing a comprehensive and integrated framework of treatment and prevention services - epitomises recent administrative endeavours to respond to such societal concerns. *Sedqa*'s remit also involves the collation and on-going analysis of various indicator data to provide *inter alia* policy-makers in the field with a scientific basis to the decision-making process.

When one takes into account that figures regarding the prevalence of the number of problem users in Malta are based on indicator rather than survey data, in making reference to *sedqa* figures is essential to build a clearer picture of the prevalence of drug use in Malta and concomitant aspects, including drug-related mortalities. *Sedqa* collates multiple indicator data on a routine basis. The most developed of which is the treatment demand indicator operated by all the treatment units within the Agency, including most notably, the Substance Misuse Unit - the Islands' major detoxification centre.

The escalating number of clients frequenting the Unit over the past six years is somewhat indicative of the increasing number of problem drug users (Table 10.1).

Table 10.1. Number of clients attending the Substance Misuse Unit, Malta, 1994-1999 (*Source*: Mallia 1999)

Year	N
1994	350
1995	505
1996	635
1997	741
1998	753
1999	797

Data collection on drug-related death

In an effort to secure a comprehensive framework of drug prevalence indicators, *sedqa* also places considerable emphasis on the collation of drug-related mortality data. Drug-related mortality is often used as an indicator of trends, such as, severe drug taking. By itself this indicator provides an incomplete picture of drug misuse patterns (EMCDDA 1997). The analysis of other drug abuse indicators is necessary for a clearer understanding to be acquired since a variety of other determinants can effect drug-related mortality rates including, for example, the population at risk, drug purity and the combination of drugs used (Council of Europe 1995).

Whenever a death occurs, a doctor is required to complete a death certificate. Where a person's demise occurs in dubious circumstances, the doctor does not issue a death certificate until the completion of a postmortem investigation. When a death occurs within the home, the family's General Practitioner (GP) would normally issue the death certificate. If the doctor regards the death as unexplainable or unjustified, the deceased is transferred to the hospital morgue for further investigation.

If a person dies in hospital, the hospital doctor is requested to complete the death certificate. If the person has been in hospital for less than 24 hours, the family doctor holds responsibility for the relevant certification process. In the event of suspect cause(s) of death, such as signs of violence or where the deceased is found to be of a relatively young age, an autopsy is requested. In such instances, police investigations are also initiated.

Once the police are on site, the magistrate on duty is informed of the incident. The magistrate normally appoints a forensic expert to effect the relevant examinations. At this juncture, an autopsy and/or toxicology (or other) tests are sanctioned. A provisional death certificate is issued at this stage, with proceedings for burial initiated. The body, however, may be retained for further investigation if necessary. In the latter case, burial is only permissible upon the inquiring magistrate’s approval.

The pathologist shoulders the onus for registering the cause of death on the "final" death certificate. The environment within which the death occurs is also given due consideration - with emphasis made on drug use paraphernalia, in suspected DRD cases. On retrieval of all the necessary information at the site of death, body fluids are assigned to the Toxicology Department for further investigation. Such investigations include blood, urine, bile and stomach contents tests. The ensuing results may determine whether illicit substances were present or not, and if so, whether the levels of which were responsible for the deceased's death.

In addition to these tests, the forensic expert also needs to determine the deceased's past history. This process assists the possibility of identifying or eliminating potential factors related to the cause(s) of death. The aetiology

and extent of the deceased's illicit drug use may be an important criterion in this regard.

The relevant information is retrieved from two major data sources - the Department of Health Information and the Police Drug Squad. DRDs in Malta generally refer to the demise of persons caused by acute intoxication (overdose), although differences in case definitions, methods of data collection and divergent sources of information give rise to disparity in the records collated by the relevant bodies.

The Department of Health Information records cases of sudden and unexpected deaths or deaths occurring in suspicious circumstances in which licit and/or illicit drugs are found in samples tested by toxicologists/pathologists. Drug–related mortality figures include deaths caused by accidental or intentional poisonings and poisonings with undetermined intent, which are coded and classified according ICD-10 (World Health Organisation 1992). These cases are further broken down by substance type. ICD-10 was introduced in Malta in 1995 to code and classify causes of death, and Malta was amongst the first five countries in Europe to do so (Department of Health Information 1996).

The police drug squad also collects information on DRDs. The police data document cases of death caused by acute intoxication, broken down by substance type. The police drug squad is notified of DRD cases *a priori,* and if the victim is considered to be a regular consumer of illicit substances or if drug paraphernalia is found on site, the case is subject to a magisterial enquiry, whereby the magistrate calls for toxicology and pathology investigations to be conducted. This case definition of DRDs has a number of limitations and could be deemed to be incomplete and minimalistic, particularly through its prohibitive association of DRDs with fatal overdose cases.

Similar criticism may be levelled at the Department of Health Information definition of DRDs. For example, in this case suicides by acute intoxication or overdose are recorded as drug deaths even if there is no history of drug misuse. In addition, many deaths result indirectly from drug misuse and such cases are not included in either data sources. Causes of death, which are indirectly related to drugs, are extensive. Ravenholt (as cited in NIDA 1998) has published a comprehensive list of causes of deaths related to alcohol and other drugs. These include, for example, alcoholic hepatitis, cancer of the stomach, cerebrovascular disease, motor vehicle accidents, HIV, hepatitis and other viral infections, homicide and drug withdrawal syndrome in new-borns. However, the effect of such incidences on the mortality rate is difficult to measure, and this area has not been adequately explored in this country. Further data in this area would assist policy makers in drawing up strategies to prevent indirect DRDs.

Results

It is also the opinion of the authors that in both instances delineated above, the disparate DRD case definitions in operation yield inconsistencies in data collation and reporting. Tables 10.2 and 10.3 below clearly illustrate such disparity.

Table 10.2. Overdose DRDs recorded by police, Malta, 1995-1998
(*Source*: Police Drug Squad, 1995 – 1999)

Year	Number of deaths			Deaths per 100,000 population*
	Males	Females	Total	
1995	2	2	4	0.001
1996	3	1	4	0.001
1997	5	0	5	0.013
1998	5	1	6	0.016

**Based on a total population of 378,000 persons*

Table 10.3. DRDs recorded by the Department of Health, by gender, Malta, 1995-1998 (*Source*: Department of Health Information, 1996, 1999)

Year	Number of deaths			Deaths per 100,000 population[3]
	Males	Females	Total	
1995	3	2	5	0.013
1996	2	1	3	0.008
1997	8	1	9	0.024
1998	4	1	5	0.013

Whilst acknowledging that the small numbers above limit the need for great concern, one may observe a discrepancy between the records of both data sources in each year. While for 1995 the Police Drug Squad figures indicate a total of four DRDs, the Health Information Department statistics account for five such deaths. This discrepancy may be attributed to the inclusion of "*death by medicinals*" in the Health Department's Annual Mortality Report (Department of Health Information, 1996).

Inconsistencies in data reporting of DRDs may also be observed for the 1996-98 records. The Police Drug Squad's restrictive definition of DRDs tends to

deflate the corresponding annual DRD figures. For example, further scrutiny of the 1997 data revealed that three of the total nine DRDs reported by pathology experts were due to alcohol intoxication. Clearly, these cases would not be included in the Police Drug Squad data. Neither would one death by carbon monoxide poisoning also listed in the Health Information Department 1997 fatal overdose cases.

Discussion and conclusion

Apart from the problematic nature of data recording processes, drug mortality cases in Malta are further compounded by the nature of DRD inquiries. General Practitioners, the police, inquiring magistrates, and forensic examiners/pathologists play an equally pivotal role in the Maltese system of investigating deaths. Conversely, death inquests in Malta do not entail the involvement of a coroner.

Reduction in drug-related death is one reason considered when establishing generic prevention/treatment interventions. The main thrust of these measures is represented in a personalised service-orientated strategy, whereby drug users are offered a continuum of bio-psycho-social services encompassing drug detoxification (in- and out-patient level), psycho-social support, community-based and residential rehabilitation and after-care services. Drug prevention policy in Malta also targets the reduction of use of dangerous substances through primary prevention programmes, organised by both statutory and non-statutory agencies. “At risk” secondary prevention initiatives have also been recently introduced to target vulnerable groups. These are still at an embryonic stage and further intensification of efforts in this regard is required.

Malta's size and cohesive social structure have assisted attempts to develop and undertake a comprehensive substance misuse treatment and prevention strategy. Undoubtedly, such efforts have curtailed the wider proliferation of drug-related deaths. Yet, each fatality remains a tragedy, leaving lasting scars on the victim's family, friends and dependants. Relentless vigilance is imperative to prevent the horrid pain behind any DRD statistic.

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Chapter 11 Drug-related mortality in the Netherlands

M van Laar and G Cruts

Summary

In the Netherlands drug-related mortality seems to be lower than in other Western countries. It appears, however, that comparisons between different countries in regard to drug-related mortality are still difficult to make.

The *Causes of Death Statistics* from Statistics Netherlands (CBS) contains information about acute deaths directly due to drug use among inhabitants of the Netherlands. Between 1985 and 1998 the number of acute deaths on average was 44 cases a year, with a minimum of 23 in 1987 and a maximum of 69 in 1997. The majority of cases concern deaths due to an overdose of opiates and fewer cases concern an overdose by cocaine, amphetamines and/or ecstasy. Drug-related mortality therefore seems rather low in the Netherlands. It is, however, not yet known to what extent drug-related mortality becomes visible in these figures of Statistics Netherlands. This is being investigated at the moment.

The Municipal Health Service of Amsterdam (GG and GD) registers some information about the causes of death among drug users in its local service area. Here it also includes deceased foreigners that do not count in the *Causes of Death Statistics* from Statistics Netherlands. In 1998 a total of 92 deaths were counted among drug users. For 27% an overdose was the cause of death; 50% of the drug users died from other causes like an accident, infectious disease or suicide; and 23% of the deceased were suffering from HIV. In past years the GG and GD has shown a decline in the number of deaths. This decline is partly accounted for by the repatriation of foreign addicts, who have a higher risk of death because of their stronger tendency to inject. From the Amsterdam Cohort Study among drug users it appears that the chances of dying increase progressively by injecting drugs, being infected with HIV (especially with a decrease in CD4 cells), and polydrug use. A high dose of methadone on the other hand has a protective effect.

Differences between countries in drug-related mortality can reflect real variations, but can also be the result of other factors. Countries diverge in investigating causes of death, filling in causes of death certificates, and variation in coding by the statistical bureaux, and defining and selecting codes that count as drug-related mortality.

The EU drug agency in Lisbon, the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) has launched diverse projects to ultimately arrive at comparable figures on drug-related mortality. The Trimbos Institute co-ordinates a project to harmonise the definition of drug-related mortality. According to the proposed definition, drug-related mortality information is

available for some countries. According to the current state of affairs the drug-related mortality per 100,000 inhabitants is as follows: 0.35 for France; 0.45 for the Netherlands; 1.21 for Belgium; 1.33 for Germany; 1.46 for Austria; 1.91 for Sweden; and 2.66 for England and Wales. The Netherlands here shows a relatively low drug-related mortality. Here it should be noted, however, that mortality figures between countries can still be connected to differences in procedures, like the frequency and quality of post-mortem analyses. Investigations are currently being undertaken in the Netherlands as to how the detection and registration of drug-related mortality can be improved.

In Nederland lijkt het aantal mensen dat jaarlijks overlijdt aan de gevolgen van drugsgebruik lager te liggen dan in andere westerse landen. Het blijkt echter dat vergelijkingen tussen verschillende landen in drugsgerelateerde sterfte nog moeilijk zijn te maken.

De 'Doodsoorzakenstatistiek' van het Centraal Bureau voor de Statistiek (CBS) bevat gegevens over de acute sterfte door drugsgebruik bij inwoners van Nederland. Tussen 1985 en 1998 ligt de landelijke acute sterfte op gemiddeld 44 gevallen per jaar, met een minimum van 23 in 1987 en een maximum van 69 in 1997. Voor het merendeel betreft dit sterfte door een overdosis opiaten en in mindere mate door een overdosis cocaïne, amfetaminen en/of ecstasy. De drugsgerelateerde sterfte lijkt daarmee erg laag in Nederland. Het is echter nog niet bekend in welke mate de drugsgerelateerde sterfte zichtbaar wordt in deze cijfers van het CBS. Dit wordt momenteel onderzocht.

De GG and GD Amsterdam registreert enkele gegevens over doodsoorzaken van drugsgebruikers in haar lokale verzorgingsgebied. Het betreft hier tevens overleden buitenlanders die niet meetellen in de doodsoorzakenstatistiek van het CBS. In 1998 werden in totaal 92 sterfgevallen onder druggebruikers geteld. Voor 27% was overdosis de doodsoorzaak; 50% van de druggebruikers overleed door andere oorzaken, zoals een ongeval, infectieziekte of suicide en 23% van de overledenen was HIV-ziek. De GG and GD signaleert een afname van het aantal sterfgevallen in de loop der jaren. Deze daling komt deels op conto van het verdwijnen van buitenlandse verslaafden, die een hoger sterfterisico hebben vanwege hun sterkere neiging tot spuiten. Uit de Amsterdamse Cohort Studie onder drugsgebruikers blijkt dat de kans om te sterven progressief toeneemt met het injecteren van drugs, het besmet zijn met HIV (vooral bij afname CD4 cellen) en polydruggebruik. Een hoge dosis methadon heeft daarentegen een beschermende werking.

Verschillen tussen landen in drugsgerelateerde sterfte kunnen werkelijke variaties weerspiegelen, maar kunnen ook het gevolg zijn van andere factoren. Landen zijn divers in het onderzoeken van doodsoorzaken, het invullen van aangifteformulieren, het coderen bij de statistische bureaus en het definiëren, c.q. selecteren van de codes die meetellen voor drugsgerelateerde sterfte.

Het EU-drugsagentschap te Lissabon, het zogenaamde Europees Waarnemingscentrum voor Drugs en Drugsverslaving (EWDD) heeft verschillende projecten gelanceerd om uiteindelijk te komen tot vergelijkbare cijfers over drugsgerelateerde sterfte. Het Trimbos-instituut coördineert een project om de definitie van drugsgerelateerde sterfte te harmoniseren. Volgens de voorgestelde definitie is de drugsgerelateerde sterfte voor een aantal landen beschikbaar. Volgens de huidige stand van zaken is de drugsgerelateerde sterfte per 100.000 inwoners als volgt: 0,35 voor Frankrijk; 0,45 voor Nederland; 1,21 voor België; 1,33 voor Duitsland; 1,46 voor Oostenrijk; 1,91 voor Zweden en 2,66 voor Engeland en Wales. Nederland vertoont hier een relatief lage drugsgerelateerde sterfte. Hierbij dient wel te worden aangetekend dat sterftecijfers tussen landen nog steeds kunnen samenhangen met verschillen in procedures, zoals de frequentie en kwaliteit van post-mortem analyses. Voor Nederland wordt momenteel onderzocht hoe de detectie en registratie van drugsgerelateerde sterfte kan worden verbeterd.

Introduction

Compared with other Western countries, the number of drug-related deaths in the Netherlands seems to be low. This has often been cited as one of the more important achievements of the Dutch harm reduction policy. In this chapter we will provide the relevant respective statistics and will illustrate difficulties in making cross-national comparisons. We will start with presenting some background information on drug use in the Netherlands followed by a description of the main sources on drug-related deaths and the data they generate. To put the Dutch statistics in perspective, reference will be made to a study by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) to improve the comparability and quality of data on drug-related deaths in the Member States of the European Union.

Similar to other Western countries, cannabis is by far the most popular illicit drug. In 1997 the lifetime prevalence of use in the general population of 12 years and over was 16% and the last month prevalence 2.5% (Abraham *et al* 1999). The highest drug use rates are found in the four major cities (Amsterdam, Rotterdam, The Hague, and Utrecht). In the past decade the consumption of cannabis among young people showed a steady increase but recently it levelled off (De Zwart *et al* 2000). Cocaine, amphetamine and ecstasy are used appreciably less frequently, although prevalence rates may be higher among young people visiting (dance) parties and clubs. Illicit opiate use is largely non-existent in populations captured by regular surveys. Various estimation methods yield a number of 25,000-29,000 problematic opiate users in the Netherlands (Toet 1999). Today the large majority (80%-90%) of these drug users do not stick to heroin and/or methadone but also regularly consume cannabis, alcohol, psychoactive medicines and, above all, cocaine. There is an ageing trend in this population, which is in part explained by a decreasing influx of young opiate (or polydrug) users (Van Laar 1999). Heroin has lost much of its attraction for the young; it is now seen as a 'losers' drug.

Dutch drug policy aims to prevent and minimise the risks of drug use for the individual drug users, their immediate environment as well as society at large. Harm reduction measures include the supply of maintenance methadone and syringe exchange. Apparently the start of such activities was too late to prevent a high seroprevalence rate among drug injectors in Amsterdam (26%). Much lower rates are found in other cities and less urbanised regions (0%-12%) (Berns *et al* 2000). About 80% of the (ever) injectors are infected with the hepatitis C virus, which is much more infectious than HIV (Wiessing *et al* 1995, Carsauw *et al* 1997). Among those infected there is a serious risk of chronic liver disease, especially with concomitant infection of hepatitis A/B and alcoholism. In the future, this may pose a significant burden on the health system. The rate of drug injection, one of the risk factors associated with overdose deaths, has declined sharply in the past decade and is around 14% among opiate users in treatment. Today, smoking is the main route of drug administration. This trend may be related to various cultural and drug market factors (Van Ameijden and Coutinho 2001). For example, drug users may cease injecting because of major health problems, inability to inject (damaged veins), pressure of important others, and cultural disapproval. Moreover, injecting rates are influenced by Surinamese or Antillean drug users, who hardly inject because of a cultural taboo on skin-piercing (Grund and Blanken 1993). The upsurge in the use and availability of non-injecting cocaine (crack), and he decrease in the availability of (injectable) cocaine and heroin might also have played a role (Van Ameijden and Coutinho, in press).

Sources of drug-related deaths: procedures and data

In this chapter three sources of information on drug-related deaths will be described, which differ with regard to geographical coverage, the population involved, and the inclusion of causes of death.

The main source providing the official Dutch statistics on drug-related deaths is the General Mortality Register (GMR) or *Causes of Death Statistics* held by Statistics Netherlands - CBS - (Bonte *et al* 1985.) This register has national coverage, includes only residents of the Netherlands and provides data especially on acute mortality due to drug use. Cases refer mainly to ‘overdose’, although ‘acute intoxication’ may be a more appropriate term given the multiple factors beyond drug dose that determine a fatal outcome (WHO 1993). The GMR data do not offer a distinction between experimental and habitual drug users, and are not suitable to trace deaths due to rare toxicological substances (e.g. various synthetic drugs).

Two other information sources focus on the Amsterdam region only. Each year the Municipal Health Service of Amsterdam collects data on all kinds of causes of death among known hard drug addicts (methadone clients). Overdose cases may also concern other persons (e.g. Van Brussel and Buster 1999).

The third source, the Amsterdam Cohort Study on HIV and AIDS among (injecting) drug users, provides information on the incidence, prevalence and risk factors related to morbidity and mortality among (injecting) drug users (e.g. Van Ameijden *et al* 1999, Van Haastrecht *et al* 1996). The Amsterdam sources may include residents of the Netherlands as well as foreigners who are not officially registered as residents. Because drug users in Amsterdam are relatively old and have a long history of drug use, with associated medical and psychiatric pathology, the data may not be representative of the Netherlands as a whole.

1. General Mortality Register

The official name of the Dutch General Mortality Register (GMR) is the 'Doodsoorzakenstatistiek' (Causes of Death Statistics), held by Statistics Netherlands (CBS), a governmental agency. Causes of death are classified according to the International Classification of Diseases, Injuries and Causes of Death (ICD). Table 11.1 below lists the ICD codes used by Statistics Netherlands to report on the number of drug-related deaths. From 1979 through 1995 ICD-9 codes were used, and from 1996 onwards ICD-10 codes were used. Cases are coded on the basis of information written on death certificates. For natural causes of death, such as heart disease, these certificates are usually completed by medical doctors.

Table 11.1. ICD codes used to report on the number of DRDs, Netherlands* (*Source*: Statistics Netherlands (CBS))

	ICD-9 codes: 1979-1995
292	Drug psychosis
304	Drug dependence
305.2-9	Nondependent drug abuse
E850.0	Accidental poisoning – opiates and related narcotics
E854.1	Accidental poisoning – hallucinogens
E854.2	Accidental poisoning – psychostimulants
	ICD-10 codes: 1996-present
F11-F16, F18-F19	Mental and behavioural disorders – cannabis, sedatives and hypnotics, cocaine, other stimulants, hallucinogens, volatile solvents, multiple drugs, other psychoactive substances
X42	Accidental poisoning – incl. cannabis, cocaine, heroin, LSD, mescaline, methadone, morphine, opium
X41 with T43.6	Accidental poisoning – psychostimulants

** Underlying causes of death*

In the case of a (suspected) unnatural death, such as an accident or drug overdose, the medical doctor must warn the public prosecutor. In the case of a suspected overdose, the coroner investigates the body and the place and circumstances (e.g. presence of drugs, needle marks, paraphernalia, farewell letter etc.). Additional 'internal inquiries', i.e. postmortem examinations including toxicological screening, are usually carried out only when criminal activities are suspected or when uncertainty remains with regard to the manner of death (e.g. accidents, suicide, or homicide).

The precise frequency of postmortem examinations in the Netherlands in case of a suspected drug-related death is not known. This also applies to the actual use of such information, which may become available with some delay, during codification. A detailed account of the procedures followed in the cause of death investigation and registration of drug-related deaths in the Netherlands will be available in 2001 (De Zwart and Toet 1998).

Most drug-related deaths are classified as accidental poisoning (E-codes). Code 304 (drug dependence) is only assigned as underlying cause when the death certificate indicates that the deceased was a drug addict without specifying another cause of death. The Dutch 'definition' includes a restricted number of substances and excludes intentional poisoning (suicide) or poisoning with undetermined intent, regardless of the substances involved. Deaths related to long-term drug use, such as AIDS or hepatitis C, or related to traffic accidents under the influence of drugs, are also not included. This is partially a matter of convention. However, there are also practical problems in obtaining reliable figures on such deaths. These cases are commonly coded to the underlying disease without consistently notifying drug use or dependence as a contributing cause of death. In case of traffic accidents the limited availability of toxicological data may play a role, as well as difficulties in establishing a causal link between drug levels and accident risk.

The transition from ICD-9 to ICD-10 had consequences for the inclusion of cases. As shown in Table 11.1, the ICD-10 codes cover a broader range of substances compared to the ICD-9 codes. These changes should be taken into account when interpreting the figures. Table 11.2 below shows the number of cases recorded from 1985 through 1998 according to the selections listed in Table 11.1 above. Acute drug-related deaths appear to be infrequent among Dutch residents and the casualty rate has fluctuated slightly over the years. The large majority of the deceased were males aged between 25 and 44 years (75%). The relatively low frequency of intravenous drug use in the Netherlands may contribute to these low figures.

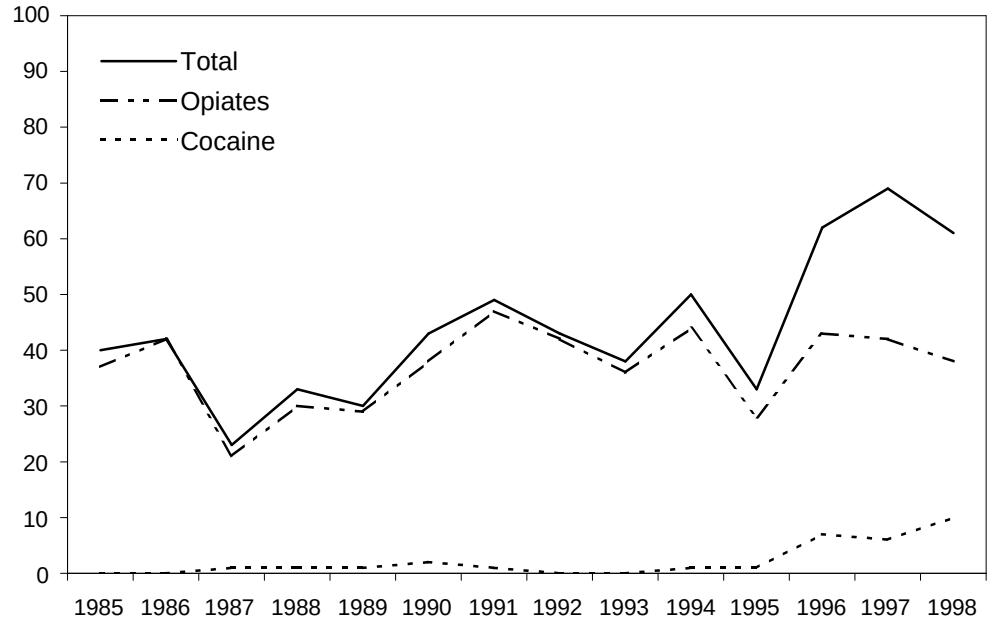
The increase in deaths in 1996 may be related to differences between coding systems as well as a broadening of the 'case definition' of drug-related deaths under the ICD-10 as explained above. This last assumption is supported by a breakdown of data by substance. Some caution is warranted, however, because GMRs are usually not suited to give detailed information on the specific substances involved.

Table 11.2. Number of acute DMDs in the Netherlands, 1985-1998*
(*Source*: Statistics Netherlands (CBS))

Year	Males	Females	Total
1985	34	6	40
1986	38	4	42
1987	19	4	23
1988	30	3	33
1989	26	4	30
1990	36	7	43
1991	46	3	49
1992	40	3	43
1993	30	8	38
1994	38	12	50
1995	24	9	33
1996	47	15	62
1997	57	12	69
1998	55	6	61

** See Table 11.1 for the selections of codes*

Figure 11.1. Number of acute DMDs in the Netherlands according to a selection of ICD-9 codes (1985-1995) and ICD-10 codes (1996-1998)



For an explanation of codes: see Table 11.2.

Figure 11.1 shows that almost all cases counted between 1985 and 1995 were related to opiate use. Most of these drug users have probably consumed other drugs in addition to opiates. However, an internal coding rule of Statistics Netherlands gives priority to opiates. From 1996 the proportion of opiate deaths remained stable: 37 per year on average. Part of the increase in 'other deaths' was related to cocaine (8 between 1985-1995 against 23 between 1996-1998). This trend might reflect the increased use of cocaine. Yet, in 1998 there were some 17 remaining cases due to accidental poisoning by "other or unspecified narcotics" and "other or unspecified psychodysleptics". These causes of death were not counted under the ICD-9 selection. With regard to other drugs, such as cannabis, LSD or psilocybin, fatal overdoses are relatively rare events, although nonfatal emergencies have been recorded by the Amsterdam ambulance service (Van Brussel and Buster 1999). Amphetamine poisoning as an underlying cause of death has been recorded in the GMR with a frequency of 1 to 3 per year.

Various amphetamine-like substances are traded in the Dutch market as ecstasy, which carries a risk for the consumer who may not be aware of the precise components of 'ecstasy-pills'. Precise risk factors underlying fatal events are not known but may include a high ambient temperature, heavy physical exertion, dehydration, and individual vulnerability (Pennings *et al* 1998). To establish whether fatalities are related to the use of specific substances, detailed toxicological analyses are required. Occasionally such information is published. From August 1994 through February 1997, 37 fatal cases of apparent overdose by amphetamine- or phenylpropanolamine-derivatives (methamphetamine, MDA, MDMA, MDEA) were brought to the attention of the pathological and toxicological laboratories in the Netherlands (Lusthof *et al* 1998). Autopsies did not demonstrate a clear anatomical cause of death. In 19 cases, amphetamine derivatives were considered to be the main cause of death. Amphetamine was detected in 13 blood samples, followed by MDMA (11), MDA (9) MDEA (4) and methamphetamine (2). The figures do not sum to 19, as most samples contained more than one substance. In the 18 remaining cases, amphetamine-derivatives were present but death was ascribed to other drugs, a combination of drugs and/or alcohol or unknown causes. Since 1997, newspapers have mentioned several fatalities at house-parties that were suggested to be related to the use of ecstasy-like substances. However, the underlying causes of death have not been officially confirmed.

2. Registration of drug-related deaths in Amsterdam

Statistics on drug-related deaths in Amsterdam are published by the Municipal Health Service of Amsterdam (Van Brussel and Buster 1999). Cases are traced each year by combining data from the Central Methadone Register, the municipal registrar's office, the municipal coroners, hospital records, and the police. Data on overdoses from Amsterdam coroners also concern foreigners not included in the Population Registry. This is in contrast to the GMR, which only includes Dutch residents. By the end of the eighties some 30%-40% of the suspected overdose cases in Amsterdam were confirmed by a

postmortem examination, mostly including toxicological screening (Cobelens 1990). The autopsy rate today is not known but is assumed to be lower. This makes a differentiation into substances underlying death difficult. However, most fatal overdoses among users known in the Central Methadone Register are likely due to a toxic combination of heroin, methadone, cocaine, benzodiazepines, and/or alcohol (personal communication M. Buster). The category HIV-infection should be interpreted with caution because drug users with HIV might have died from AIDS but also from other diseases (see the next section).

Figure 11.2. Mortality among drug users in Amsterdam, 1992-1998
(*Source: http://www.zorgstad.amsterdam.nl/gemeente/gggd)*

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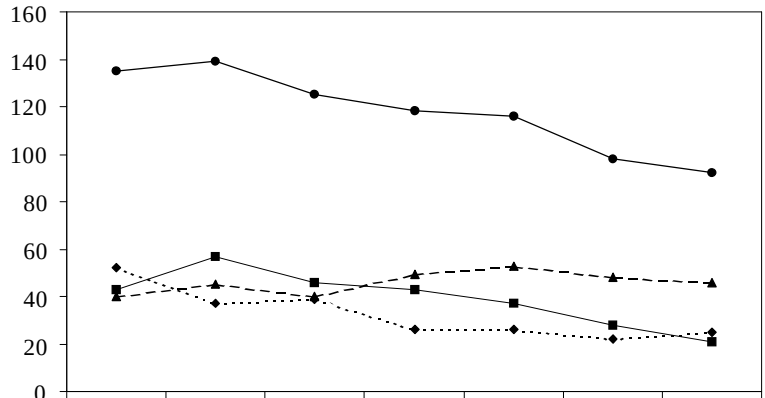


	1992	1993	1994	1995	1996	1997	1998
Overdose	52	37	39	26	26	22	25
HIV+ drug users	43	57	46	43	37	28	21
Other*	40	45	40	49	53	48	46
Total	135	139	125	118	116	98	92

(*incl. endocarditis, sepsis, pneumonia, suicide, accidents, violence).

Figure 11.2 above shows the number of drug-related deaths from 1992 to 1998. In this seven-year period 823 drug users died. The decreasing trend can be explained in part by the strong decline of foreign drug users in Amsterdam (e.g. due to repatriations, restricted entrance to Dutch methadone programmes, and improved care in home countries). As the proportion of drug injectors among these foreigners is high, and injecting is associated with an increased risk of overdose, such a decline has relatively great impact on mortality figures. Another factor is the declining mortality among HIV positive users, among others due to the decreasing HIV incidence and improved treatment modalities. While the intravenous administration of drugs is most risky, the smoking of cocaine and heroin is increasingly associated with respiratory diseases, especially in persons with a history of heavy tobacco use (Khalsa *et al* 1992, Tashkin *et al* 1997, Coumans *et al* 2000). An increasing number of drug users suffer from chronic obstructive pulmonary disorder (COPD). In the long term this condition may lead to lung emphysema

and even to death (Van Brussel and Buster 1999).
Although the total number of drug-related deaths in Amsterdam is decreasing, the mortality rate remains high or even slightly increased (2 per 100 drug users per year). This signals that the deaths occur within a shrinking population of (ageing) drug users, with growing medical and psychiatric complications. Mortality rates depend heavily on HIV status and way of using drugs.

3. Amsterdam Cohort Study on HIV and AIDS

Information about risk factors is available from the Amsterdam Cohort Study among (injecting) drug users, which recruits drug users from low-threshold methadone programmes and from clinics for sexually transmitted diseases among drug using prostitutes. Table 11.3 below shows that the risk of dying increases dramatically for drug injecting (without HIV) compared to non-drug injecting, and even more so with injecting drug use with HIV infection. Compared with the 'normal' Amsterdam population, the risk of dying is 50 times higher for an HIV-positive injecting drug user.

Table 11.3. Mortality rates in different populations of drug users in Amsterdam (*Source*: Amsterdam Cohort Study on HIV and Aids (Van Haastrecht, 1996))

Type of drug user	Mortality*
Amsterdam population**	1.3
Non-injecting drug users, HIV negative	7
Injecting drug users, HIV negative	18
Injecting drug users, HIV positive	64

**Deaths per 1000 person-years ** Mortality in age-matched population.*

Many drug users infected with HIV die before being clinically diagnosed with AIDS (about 38%). Overdose/suicide and diseases (e.g. infections, liver cirrhosis) are common causes of deaths in these drug users (Prins *et al* 1997). For about three-quarters of all cases of pre-AIDS death there was evidence of immunosuppression (CD4-count <500/µL) and there was a strong relationship with the progression of the disease. Concomitant infections with hepatitis B and C, resulting in impaired liver function, might also play a role. The life expectancy of HIV positive drug users is improving with the introduction of combination therapy, which may reduce pre-AIDS mortality. Polydrug use, especially concomitant consumption of benzodiazepines, increases the risk of mortality among injecting drug users, while high doses of methadone have a protective effect (Van Ameijden *et al* 1999).

Discussion: Counting DMDs in the European Union

Pitfalls in comparing statistics on DMDs

Differences in statistics on drug-related deaths between countries may be due to actual differences in drug-related mortality. However, a cursory review of the procedures and case definitions of 'drug-related deaths' used to establish these statistics reveals wide variations that hamper any definite conclusion (EMCDDA 1999a). Differences occur at various steps in the chain from the death scene to the final statistics on drug-related deaths, including the frequency and quality of cause of death investigation (e.g. toxicological analyses of bodily fluids), the way death certificates are completed, coding practices at national statistical offices and finally, case definitions. Concerning the last factor, some countries include deaths due to both illicit drugs and psychoactive medicines, such as benzodiazepines, in their definition while at the other extreme only opiates are included. Further, differences may occur as to the inclusion of direct deaths (e.g. overdose) and/or indirect deaths (e.g. traffic accidents, infectious diseases).

Improving quality and comparability of statistics on drug-related deaths

The EMCDDA has launched several projects to improve the comparability and quality of data on drug-related deaths. The current projects are co-ordinated by the Trimbos Institute. The first priority concerned the harmonisation of definitions and data collection procedures. For this purpose a protocol (DRD-Standard V1.0 - see Appendix for further details) was developed, which describes guidelines how to extract data from General Mortality Registers (EMCDDA 1999b). The standard also includes guidelines for Special Registers, held by the police or forensic institutes. This standard has recently been feasibility tested. For seven countries data could be collected that matched the standard. Data were collected for the most recent year available. Several countries had already switched to ICD-10, which explains why the registration year is slightly outdated. A draft standard based on the ICD-10 was due to be feasibility tested by the end of 2000. Two different selections of ICD-9 codes were applied to compute the number of drug-related deaths in each of these countries (see Table 11.4).

Both selections A and B only refer to typical drugs of abuse, including cannabis, cocaine, opiates, psychostimulants and hallucinogens. Selection B gives a broader definition than selection A. This is because selection B involves poisonings regardless of intent, i.e. accidental, suicide or undetermined, whereas selection A only covers accidental poisonings. It should be further noticed that only underlying causes of death are included, which implies that the resulting figures refer mainly to acute deaths or overdoses.

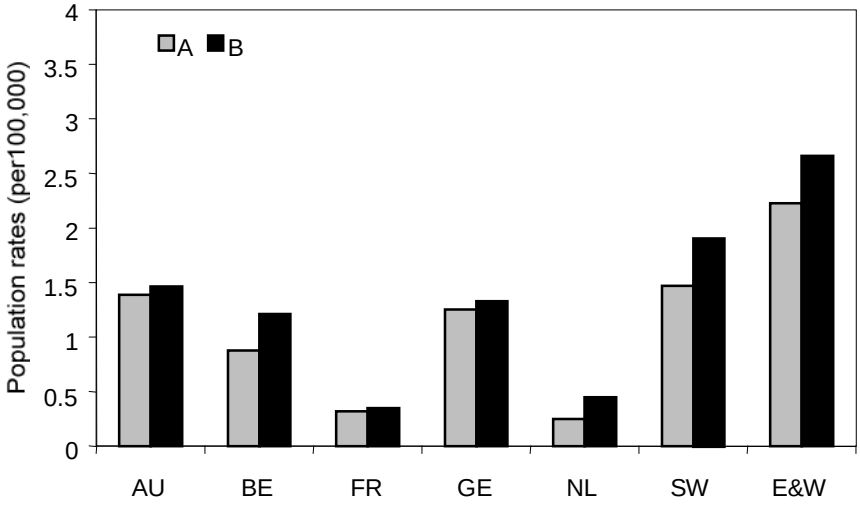
Table 11.4. Selections of ICD-9 codes according to the DRD-Standard V1.0 proposed by the EMCDDA

Selection		Underlying cause of death	ICD-9 code(s)
A	B	Drug psychoses	292
A	B	Drug dependence	304.0-9
A	B	Nondependent drug abuse	305.2-9
A	B	Accidental drug poisoning	E850.0, E850.8-9[1)], E851-2, E853.2, E854.1-2, E855.2, E855.9, and E858.8-9[1)]
	B	Suicide and self-inflicted poisoning	E950.0-5[1)]
	B	Poisoning undetermined intent	E980.0-5[1)]

[1)] *Extracted in combination with nature of injury codes to select only drugs of abuse (965.0, 968.5, 969.6, 969.7).*

Figure 11.3 shows the results. Note that for comparative reasons population rates have been calculated as well as absolute numbers (see Table 11.5). Population rates in England and Wales are at the top of the list followed by Sweden. France and the Netherlands have the lowest rates. The difference between A and B is relatively small in most countries. This means that suicide and poisoning with undetermined intent due to drugs of abuse are relatively infrequent events. This contrasts with mortality due to psychoactive medicines, such as benzodiazepines, which is highly associated with suicide.

Figure 11.3. Effects of different selections of ICD-9 codes on the number of registered drug-related deaths in seven European countries (registration years: see Table 11.5)



Although we have excluded the influence of different case definitions, it is still not fully justified to conclude that these figures only reflect different mortality rates. Other interpretations are still open. For illustration, variations in the frequency of postmortem examinations may also play a role, such as noticed for Sweden and the Netherlands (Van Laar and De Zwart 1998). By law, (suspected) drug-related deceased persons in Sweden undergo a (medico-legal) examination. Studies in the Stockholm area showed that this occurred for 80%-90% of the cases (Fugelstad 1997). Such an examination, which commonly involves toxicological analyses, may enhance the detection of DMDs. As we have described in the previous section, unnatural deaths in the Netherlands (such as drug overdose) are generally only subjected to forensic examinations when a crime is suspected. Hence, the frequency of postmortem examinations for DMDs is much lower (<30%-40%). However, the precise 'added value' of postmortem examinations in detecting and correctly classifying DMDs is hard to quantify.

Table 11.5. Number of acute DMDs according to different 'definitions' given by EMCDDA selections A and B*

Country (year)	Number		Number per 100,000	
	A	B	A	B
Austria (1998)	112	118	1.39	1.46
Belgium (1994)	89	122	0.88	1.21
France (1997)	187	204	0.32	0.35
Germany (1997)	1025	1088	1.25	1.33
Netherlands (1995)	38	70	0.25	0.45
Sweden (1996)	130	169	1.47	1.91
England & Wales (1998)	1165	1389	2.23	2.66

** See Table 11.4. Selection B will be used as the official EMCDDA standard to report on drug-related deaths.*

As mentioned in the introduction to this section, the implementation of the DRD-Standard addresses only the tip of the iceberg by harmonising data extraction procedures. Unless procedures prior to this final stage are harmonised, full comparability will not be achieved.

Conclusion

Based on national statistics, the size of acute drug-related mortality in the Netherlands seems to be relatively low compared to other countries. Ways to improve the detection and recording of drug-related deaths are now being investigated. Future activities might focus on other (indirect) causes of death among drug users at the national level to obtain a more comprehensive picture of drug-related mortality.

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Chapter 12 Drug-related mortality in Portugal and Spain: A review

F Schifano

Introduction

Drug-related deaths have become a major source of premature mortality. In southern European countries, some of the different drug-related issues can show some discrepancies with respect to other countries. In Spain, for example (in the 1981–1994 period) the HIV epidemic was still uncontrolled, with a high incidence among recent birth cohorts, while in Portugal, at the same period, the epidemic was at an early and expanding phase (Houweling *et al* 1999). A higher prevalence of injecting drug use may explain some of the generally higher HIV incidence rates in southern European countries, but the larger part of it is most likely explained by local characteristics of drug users, such as younger age and more frequent sharing of needles and syringes, and possibly a less effective public health response (Houweling *et al* 1999).

The above-named factors can conceivably influence even the drug-mortality rate itself and this possible difference is what prompted us to better study the issue in these European regions. To obtain the relevant data, we performed a *Medline* search (in all languages) using the key-words "substance misuse"; "drug-related deaths" and "drug-related mortality". For Portugal, we also examined the figures offered by the relevant and appropriate governmental organisations and police forces. For a more complete understanding of the phenomenon, however, the general drug-related data pertaining to Spain and Portugal will be examined first.

Cannabis is the most frequently used substance in the European Union (EU); the lifetime experience with the drug in the adult population in Spain is about 22%, while the last 12-months prevalence rate was 7.3% for all adults and 12.8% in younger adults (EMCDDA 2000). On the other hand, the "problematic drug use" (defined as "intravenous or longer duration/regular use of opiates, cocaine and/or amphetamines") prevalence rates seem (inside the EU) highest in Spain (together with Italy, UK and Luxembourg), peaking at 6.6 problematic drug users per 1,000 inhabitants aged 15 to 64 (Portugal was unable to provide estimates). In Spain, the total population of those aged 15 to 64 is 26,866,300 (while in Portugal it is 6,760,800). Cocaine, throughout Europe, is the main drug under 10% of treatment admissions, except in Spain (11%) and in the Netherlands. In Spain the last 12-months prevalence rate for young adults' use of cocaine was 3.4% (EMCDDA 2000). As stated above, Portugal and Spain have the highest HIV prevalence rate in Europe. In late 1998, local HIV prevalence in a group of drug addicts (mostly injectors) in Lisbon was 48%, while the official figure for the whole of Spain was 32% (and about 27% for the whole Portugal). Again, Portugal is the only country in

Europe in which AIDS cases continue to increase (possibly indicating low uptake of treatment and/or increased HIV infection rates).

Arrests for all drug offences in Europe have increased steadily since the mid–1980s and markedly since 1994, but Spain and Portugal (together with Greece) report the highest recent increases (in Portugal, 40%–60% of arrests involved heroin). In Spain, an increased availability of cheaper heroin, particularly the "brown" smokable variety, has been recently reported. With respect to national drug policies, it is worth noting that Portugal's strategy allows for depenalising drug use or possession for personal use, with offences incurring administrative sanctions (such as fines, confiscation of a driving license or passport), as introduced in Spain in 1992 and in Italy in 1993. Together with a few other European countries, Spain and Portugal have intensified their efforts to assist drug users to reintegrate into society and stabilise their lifestyles. In these countries, subsidised employment programmes for former drug users are reported, either as specific projects to promote integration into the labour market or a subsidised employment scheme. Again, increasing housing initiatives for former users are offered, either in supported accommodation, ordinary flats or with families.

With respect to the introduction of substitution treatments (see also Ghodse *et al* 1998), methadone was introduced in Spain in 1983 (while LAAM has been available since 1997 and buprenorphine trials are in progress). In Portugal (where LAAM has been a prescribable substitute treatment since 1994), methadone was introduced in 1977.

Data on drug-related deaths

Portugal

According to the 1997 report on the drug situation in Portugal (Ministry of Justice 1997, Observatorio VIDA 1998) the number of deaths by overdose and related to drug use in 1996 was 232, representing an increase of 17.2% with respect to 1995. Males were the most affected group, representing 92.2% of the overdoses and drug-related death cases. In addition, 46.6% of drug addicts who died were over 30 years old, 28.5% were aged between 25-29 years old and 20.7% were aged between 20-24 years old. Lastly, the opiates alone (or in association with other drugs) were the substances responsible for 91.4% of observed deaths, 43.5% being imputed to opiates alone. The above-described data were gathered from the Forensic Institutes; in Portugal there are three of them and each is an autonomous institution with its own rules, procedures and definitions of cases.

Other Portuguese data for this review came from other sources (but the figures are not comparable and should be considered with caution). The Policia de Seguranca Publica (which is the urban police) made public some data pertaining to the drug-related issues; in 1995 there were 38 deaths from overdoses (out of a number of 2,036 drug users and 1,818 dealers) peaking

at 68 deaths in 1997 (out of a number of 2,731 drug users and 1,897 drug dealers). On the other hand, according to the Guardia Nacional Republicana (Gendamerie), only in the first semester of 1998, in the Lisbon area, 20 drug-related deaths were observed.

Lastly, according to Nomenclatura de Unidade Territorias para Fins Estatisticos (National Institute of Statistics) in 1996 307 deaths due to "accidental intoxication from drugs of abuse, prescribing drugs or other biological substances" were recorded.

Spain

Mortality caused by acute adverse drug reactions (AADR) increased in Spain over the eighties, to become one of the major causes of death for youth. Brugal *et al* (1995) reviewed all deaths caused by AADR autopsied in the Barcelona Forensic Institute between 1983 and 1992 and found out that, in that period, a sharp increase in AADR mortality was seen (as there were 19 deaths in the city in 1983 and 160 in 1992, with the increase concentrated in the years 1987-1989). The authors pointed out, as an explanation of the phenomenon, to changes in the illegal drug market in the city or in the patterns of abuse.

In another study, De la Fuente *et al* (1995) calculated the trend from 1983 to 1990 of drug-related mortality (defined as the sum of deaths from AADR and AIDS in drug users)] among the population aged 15 to 39 years in Madrid and compared the figures with mortality from all causes. All of the mortality rates increased from 1983 to 1990: all causes, from 101/100,000 to 148/100,000; acute drug reactions, from 3/100,000 to 15/100,000; and AIDS from 0 to 20/100,000. Drug-related mortality represented 60% of the increase in the rate from all causes in males and 170% of the increase in females.

Sanchez *et al* (1995) described temporal and geographical variations in mortality from acute reactions to opiates or cocaine and the demographic and toxicological characteristics of persons who died from these in major Spanish cities between 1983 and 1991. Mortality rates from AADR to opiates or cocaine per 100,000 population rose from 1.2 in 1983 to 8.2 in 1991. The male/female ratio was 5.9/1. The mean age of persons who died rose from 25.1 years in 1983 to 28 years in 1991. In more than 90% of cases in which toxicological tests were undertaken opiates were detected. AADR became one of the leading causes of death in persons aged 15–39 years of age, representing 11.1% of mortality from all causes in 1988 for this age group.

Orti *et al* (1996) retrospectively assessed mortality in an opiate addict cohort assembled from admissions to hospital emergency wards and drug treatment centres during the period 1985–1991. The cohort included 12,711 opiate addicts aged 15–44 years. Once again, they found that mortality rates increased throughout the entire period from 13.8 to 34.8 deaths per 1,000 persons-years, with a statistically significant increase in 1987–1988 and

1988–1989. Risk increased significantly in men and for longer length of use, but not with age.

Torralba *et al* (1996) presented an analysis of deaths due to AADR caused by opiates or cocaine in the city of Barcelona over a 5 year period (1989–1993). Annual mortality rates due to AADR for city residents in this period were estimated to be 15.3/100,000 people in the 15–49 year age group. Mortality rates were consistently higher for men (25.0) than for women (5.8). Males in the 25–29 year age group had the highest mortality rate (62.8). The highest differential in age-specific mortality by gender was seen in the 35–39 year age group, where mortality rates for men (21.5) were eight times higher than for women (2.6 per 100,000). Although all areas with high AADR mortality were areas of low socio-economic level, a more complex association between deprivation and drug use must exist, as other areas with similarly low socio-economic indicators did not suffer from such high mortality. Again, patterns related to districts which attracted drug-related deaths and districts which exported them were observed.

Pasarin *et al* (1999) performed an ecological study of all deaths of residents in Barcelona in 1989–1993. An unequal socio-economic and mortality distribution was observed between areas. The following variables, amongst the others, were found to be associated with lower socio-economic conditions: overall mortality (Risk Ratio - RR = 1.48; males); drug overdose (RR= 5.18; males and females). For AIDS and drug overdoses the increase in risk was not linear, being much higher for those areas with higher levels of unemployment.

To measure the actual mortality rate among drug addicts inside the EU, the EMCDDA commissioned a longitudinal cohort study of drug users, followed up over time in different European treatment centres (EMCDDA 1999). A standardised data form for gathering information from patient records was used and follow-up started for each drug addict enrolled from the time of entry into the cohort (date of entry into the treatment centre) to the end of the study period or to the date of death. The Barcelona cohort enrolled from 1992 included all patients residing in the city of Barcelona who began treatment for addiction. In 1997, the study population was composed of 3,500 subjects from treatment centres and 700 from prisons. Of this population, 90% were opiate users, 50% injectors, 25% HIV-positive, 25% alcohol consumers. With respect to the Rome, Sweden and Amsterdam cohorts, the highest mortality rate was observed in Barcelona (82.7/100,000 person- years) in 1994 (and the lowest in Amsterdam). The main cause of death was AIDS for both the Barcelona and Rome cohorts. In the Spanish cohort, the RR for females equalled to 0.74. No significant RR was found for educational level, while occasional workers or unemployed were found to have higher risk of mortality (RR = 1.76) than stable workers. Injecting use was found to have twice the risk of other routes of administration. Mortality rates were found to be lower in recent years, showing an RR of 0.44 in the latter period (1997–98) a decreasing trend which has been confirmed recently (EMCDDA 2000). In fact, in Barcelona the mortality rate was over 60 per 1,000 users from 1992 to 1996,

and then fell markedly, reflecting a drop in AIDS deaths (probably because of new antiretroviral treatments) and, to a lesser extent, in overdose deaths.

Discussion and Conclusion

From the studies described and considered here, it seems clear that Portugal and Spain have been characterised, during the eighties and in the first part of the nineties, by a sharp increase in drug-related deaths, an increase which has levelled off for Spain but not for Portugal. This increase in both countries paralleled well the HIV rate positivity curve over the years and it is likely that the widespread diffusion of antiretroviral medicaments is (in Spain, at least) the most likely explanation for the inversion of the ascending trend for drug mortality. Again, from this review it clearly appears that any discussion and analysis of mortality figures have to rely on the available data and this availability depends, in turn, on each country's capacity to release reliable, official and unequivocal data. In this sense, it appeared that Spanish data, in contrast to the Portuguese ones, were more easily accessible (maybe because we relied heavily for our review on a computer–based literature search, which picked up more easily, or almost exclusively, the scientific papers published in peer-reviewed journals).

Apart from qualitative and quantitative discrepancies characterising the different sources releasing the data, the between-country comparisons are made even more difficult by the presence of different methodological problems which pertain to the issue. According to the EMCDDA (2000), for example, the use of restrictive or more inclusive definitions of drug-related deaths within the same country leads to very different estimates. In fact, some definitions of drug-related deaths (for a thorough discussion, see EMCDDA, 2000) include not only drug overdoses, but also indirect drug-related deaths (AIDS, traffic accidents, homicide and suicide) so that there is virtually a different definition of drug-related death for each country.

From the present analysis, quite a few important differences and peculiarities with respect to drug-related data (and deaths) pertaining to Spain and Portugal, compared with other European countries, have emerged. Nonetheless, direct comparisons of drug-related death statistics between the two countries taken into examination might be misleading because of lack of harmonised definitions and methodologies. On the other hand, we understand that the EMCDDA is collaborating with Eurostat, the WHO and EU Member States to improve this situation, so that a single and reliable method of database implementing and processing throughout Europe will be ideally built up in the near future.

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Chapter 13 Drug-related mortality in Sweden

A Fugelstad

Summary

The Swedish population is approximately 9 million. The latest official estimate of drug addicts (1992) was 17,000 ”heavy users” but the number has probably increased since then. For a long time amphetamine was the most commonly used drug together with cannabis. Both drugs were introduced during the sixties. Presently heroin is the most frequent injecting drug.

The annual number of drug-related deaths has increased since the sixties and in 1998 the number was 263 according to official statistics. This figure includes both underlying and contributing causes of death which makes it difficult to compare the figure with other countries.

The annual mortality among addicts is estimated at one per cent among amphetamine users and 3%-4% among heroin users. The most common cause of death among heroin addicts is death in connection with drug injection. Amphetamine users mainly die from accident, suicide and homicide but also from chronic somatic lesions. The proportion of deaths from disease (e.g. HIV infection) is increasing in both groups. The majority of deceased drug addicts are examined forensically and toxicological screenings are made. An exception is those addicts who die from disease or somatic lesions. The latter group is steadily increasing. However, those deaths are seldom diagnosed as drug-related and therefore not included in the official statistics.

In order to improve the reporting of drug-related deaths it is planned to complement the official cause-of-death register with a surveillance register, primarily based on information from forensic units and hospital departments for infectious diseases. It is also planned to complete the official death certificate with a ”tick-box” in order to indicate whether the death is drug-related or not.

Sverige har ca. 9 miljoner invånare. Den senaste uppskattningen av antalet missbrukare gjordes1992 angav 17.000 ”tunga” missbrukare men sedan dess har antalet sannolikt ökat. Amfetamin var länge det dominerande missbrukspreparatet tillsammans med cannabis. Båda drogerna introducerades på 60-talet .Idag har heroin blivit den vanligaste drogen bland injektionsnarkomaner.

Det årliga antalet dödsfall har ökat sedan 60talet och var 263 individer 1998 enligt den officiella dödsorsakstatistiken. Då är både bidragande och underliggande dödsorsaker medräknade, vilket gör siffran svår att jämföra med andra länder.

Den årliga mortaliteten är ca 1% hos amfetaminmissbrukare och mellan 3%-4% hos heroinmissbrukare. Den vanligaste dödsorsaken hos heroinmissbrukare är akuta dödsfall i samband med injektion medan amfetaminmissbrukarna avlider till följd av olyckor, självmord och mord, men även kroniska organskador. Antalet dödsfall till följd av sjukdomar (ofta HIV-relaterade) och organskador ökar i båda grupperna. Majoriteten av de avlidna narkotikamissbrukarna undersöks rättsmedicinsk och genomgår toxikologisk analys. Undantag är de narkomaner som avlider på grund av sjukdomar och organskador Den gruppen ökar stadigt men erhåller sällan narkomanidiagnos och återfinns därför inte i dödsorsaksregistret.

För att förbättra statistiken över narkotikadödsfall planeras att komplettera den officiella statistiken med ett bevakningsregister främst baserat på uppgifter från rättsmedicinska enheter och infektionskliniker. Dessutom planeras en förändring av dödsorsaksintyget med en särskild "kryssruta" för att visa att ett dödsfall är relaterat till narkotika.

Introduction

Sweden has about 9 million inhabitants of whom 1.8 million live in the Stockholm area. The total number of drug addicts in Sweden is not known. A survey in 1992 (UNO) estimated the number of drug addicts in Sweden at 17,000 but this estimate was mainly based on information from the local social welfare agencies about heavy drug users. Therefore the real number of drug addicts may be higher. Information from different sources shows that the number of drug addicts has probably increased since the beginning of the 1990s.

In Sweden, the drug problem started in the sixties with the introduction of cannabis and amphetamine. Heroin was introduced in the seventies. This has led to a situation where today there exists a cohort of rather old amphetamine users in Sweden. Some of them have been exposed to amphetamine for more than 30 years, which probably influences both the mortality and the causes of death among them.

Data on drug-related death and results

Several studies from Sweden show that the annual mortality rate for drug users depends on a number of factors: for example, the types of drugs that are used; HIV-status; and, among heroin users, whether they belong to methadone maintenance programmes or not. Different studies have shown that the annual mortality among amphetamine users is about 1% and about 3% among heroin users. However, there are also studies that show annual rates among selected groups of heroin abusers of up to 12%.

One of the most important factors in detecting drug-related deaths in a population is the quality of the cause-of-death investigation. In Sweden almost 100% (99.9%) of all deaths are included in the cause-of-death register and 93% of young people that die from external causes are examined forensically (Statistics Sweden).

According to Swedish law the police must be contacted in all deaths where unnatural causes and where abuse of drugs or alcohol is suspected. This means that most drug-related deaths are investigated forensically. Follow-up studies of known addicts show that 90% of them undergo forensic investigation. In the last year this figure has decreased to 80% as HIV-infected drug-addicts often die from sequelae of their infection and are examined at hospital.

If the police decide that a death should be examined forensically it is the medical examiner who is responsible for the cause-of-death investigation and who decides about toxicological analyses and other information necessary for confirming the causes of death. The forensic cause-of-death investigation also includes a police report about the circumstances surrounding the death, an examination of the dead body including toxicological analyses of drugs and alcohol, in most cases a histological sample for microscopy and, when necessary, also hospital records and information from relatives.

After the cause-of-death investigation the medical examiner completes a death certificate with the cause and manner of death and sends it to Statistics Sweden (SCB). Statistics Sweden then classifies the death and assigns one or more ICD codes to each death certificate. They also compile a list of ICD codes for drug-related conditions, and every death for which at least one of these ICD codes has been used is flagged as drug-related in the official mortality register. There are two sources of determining drug-related death.

1. The general mortality register

In Sweden the National Board of Health and Welfare is responsible for the cause-of-death register and Statistics Sweden for producing the annual statistics. A report that includes drug-related deaths is published each year. There is however a time lag of some years in publishing the data which presently covers the deaths until 1998. In the future these reports will be more up to date and hopefully produced within a year. Drug-related deaths have been published in the annual reports since 1987 and cover the period from 1969 onwards. Table 13.1 shows that the number of deaths rose steadily from 75 in 1978 to 115 in 1983. 1984 and 1985 saw a sudden increase followed by a fall back to 1983 levels in 1989, increasing again, to reach 263 in 1998. However these numbers also include cases with a drug-related diagnosis as contributing to the cause of death. If only cases with a drug-related underlying cause of death are included the number would be considerably smaller.

One problem with the official cause-of-death register is that it is not sufficient for a satisfactory surveillance of the drug situation, or for following changes

caused by the introduction of new drugs, new fatal combinations of drugs or new patterns in the causes of death. Neither can it be used for analysing risk-groups and risk-situations as it does not give sufficient information about individual deaths. Furthermore, the delay in information precludes its use for preventive purposes, and another problem is that it does not include all drug-related deaths.

Table 13.1. Number of deaths with drug-related diagnoses according to age groups and total number, Sweden, 1978-1996

	Age group								
Year	<19	20-29	30-39	40-49	50-59	60-69	70-79	80>	Total
1978	4	40	14	6	5	0	4	2	75
1979	2	43	23	7	2	3	4	0	82
1980	1	36	24	5	4	6	3	1	80
1981	4	28	32	9	8	6	5	0	92
1982	0	42	26	12	9	11	9	2	111
1983	2	34	34	17	10	12	5	1	115
1984	3	40	42	27	24	20	8	3	167
1985	2	27	55	29	31	18	9	6	177
1986	3	35	44	36	15	18	4	0	155
1987	0	46	61	11	10	5	4	4	141
1988	2	40	47	22	6	4	2	2	125
1989	0	28	53	17	6	7	0	2	113
1990	1	44	49	28	11	7	2	1	143
1991	2	32	61	27	16	6	2	1	147
1992	1	30	73	36	14	7	11	3	175
1993	2	30	76	44	19	4	4	2	181
1994	4	39	80	47	14	11	7	3	205
1995	1	36	64	58	21	6	6	2	194
1996	3	41	87	68	23	8	6	4	240

To summarise: there are three problems concerned with the register of drug-related death that is derived from the Swedish official cause-of-death register:

- Coverage: the register includes deaths occurring among non-addicts and on the other hand it does not include all deaths that are drug-related
- Information: it does not give sufficient information about the various drugs used and information about risk factors and other circumstances in the individual cases of death
- Time factor: there is a time lag of several years from the occurrence of the death to its presence in the register

2. The "Stockholm Register": a surveillance register of drug-related deaths in the Stockholm area

The official cause-of-death register is not designed for special studies of drug-related deaths. For example, the ICD codes do not distinguish between illicit drugs and prescribed drugs.

Because of these shortcomings in the official cause-of-death register an additional register of drug-related deaths was created for the Stockholm area where about half of all drug-related deaths in Sweden occurs according to the official register. The Stockholm Register has been more comprehensively described by the Swedish Commission on Narcotic Drugs (1999).

The new Stockholm Register (SR) is based on a re-evaluation of all deaths that were examined at the department of forensic medicine in Stockholm between 1985 and 1996, and of all deaths among known HIV-infected drug-addicts who died in hospital and were examined there.

The criteria for inclusion of forensic examined cases in the SR were the presence of any illicit drugs in body fluids at the time of death or a report of drug addiction. "Illegal drugs" comprise heroin, non-medical use of morphine and methadone, amphetamine, cocaine and cannabis. LSD, fentanyl and ecstasy are also regarded as illegal drugs, but the register only contains a few isolated deaths where these drugs have been found.

Information about deaths among HIV-infected drug-addicts comes mainly from the methadone programme and the departments of infectious diseases in Stockholm.

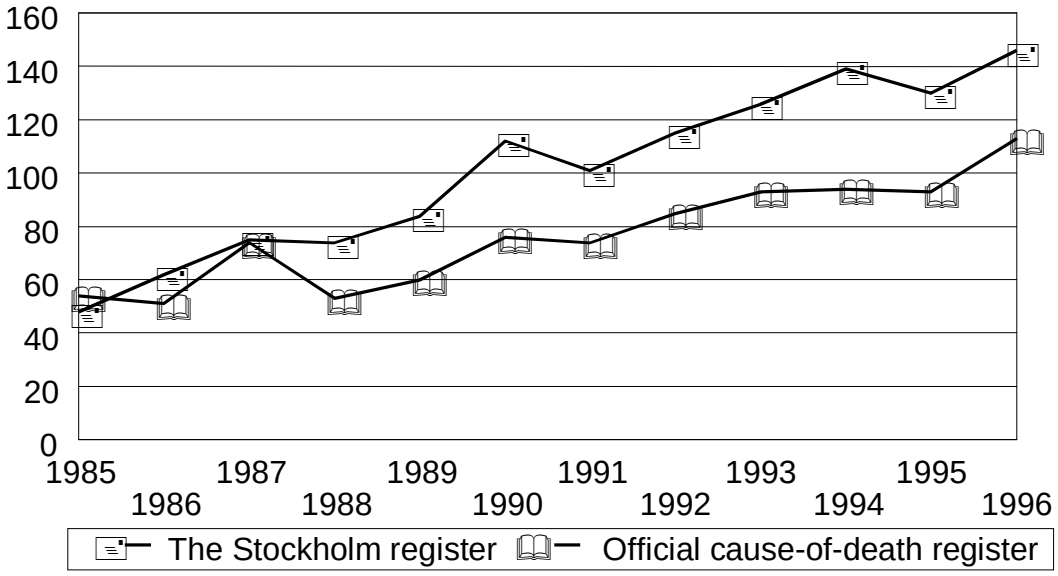
The register also contains all known deaths among hospitalised substance abusers who have died from sequelae of injecting heroin or amphetamines mostly pneumonia or cerebral haemorrhage. Such cases are rather few.

Discussion: A comparison between the official register of drug-related deaths in the Stockholm area and the Stockholm Register

Figure 13.1 shows the annual number of deaths in both registers. The Stockholm Register included more cases but the trends are similar. Most deaths were the same in both registers as the registers have a common base. That was especially true for the acute deaths and almost all deaths connected with injecting of heroin were found in both registers.

Some of the deaths were not common because of geographic differences as the official registers noted the place of residence and the Stockholm Register (SR) the place were the death occurred.

Figure 13.1. The Stockholm register and the official cause-of-death register in Stockholm: number of DRDs 1985-1996



The criteria for inclusion differed between the registers. The inclusion criteria of the SR were more generous. A number of deaths were found only in the SR which means that they were not given a drug-related diagnosis in the official register. Half of all deaths by suicide and two-thirds of all deaths due to natural causes in the SR did not receive a drug-related diagnosis in the official register.

Most of the heroin-related deaths but only one-third of the amphetamine-related and hardly any of the cannabis-related deaths in the SR received a drug-related diagnosis in the official register.

On the other hand, in the official register there was a group of deaths, about 20% of the total number, that was not found in the SR and after a closer exposure were found to be deaths occurring among non-addicts. The percentage of females in the official register was about 50 compared with 18% in the SR and the average age at death among those occurring only in the official register was approximately 50 years compared with 35 years in the SR.

One of the most important differences between the two registers is that there is more information about the individual deaths and the connection between different drugs and causes of deaths in the SR. There are not only differences in mortality rates between different drug groups but also variations in cause and manner of death. Most heroin deaths are acute deaths occurring in connection with injection of the drug. The amphetamine-related deaths show a wide panorama of causes of death, for instance there are accidents and suicides but also natural deaths often due to organic lesions after chronic drug

use. Suicides, often performed using violent methods, as well as accidents such as road accidents dominate the cannabis-related deaths.

Only a few percent of the deaths occurring among HIV-infected drug addicts received a drug-related diagnosis in the official register. This is a serious shortcoming as deaths due to natural causes (not only HIV-related) are the cause-of-death category that shows the highest rate of increase during the study period. It has risen from below five per cent in 1985 to more than 30% of all drug-related deaths in 1996.

This increase is not shown in the official register and if the increase continues in the future, which is probable, the drug-related figures in the official register might become more and more misleading.

Conclusions

The present number of drug-addicts in Sweden is not very well known. The results from a national survey will be published in 2001. According to unofficial information the number has increased since 1992, when the last survey was made. There is probably a change in the pattern of drug use since the older amphetamine addicts have been partly replaced by younger heroin addicts. The mortality rate among drug addicts in Sweden varies among different groups of addicts, from one percent annually up to over ten percent in selected groups.

The annual number of drug-related-deaths also differs due to various definitions and inclusion criteria in different registers. The official cause-of-death register can be used in order to follow the trends in overall mortality and to make international comparisons because it is based on internationally established ICD classifications which are the same all over the world and are supervised by the WHO. In Sweden the official register covers almost all acute deaths in connection with heroin injection - which is the most common cause of death among drug addicts in most European countries.

There are, however, a number of problems in comparing DMDs between countries and between different time periods using the official mortality register. Until the beginning of the nineties amphetamine was the drug most commonly used among injecting drug abusers in Sweden and most amphetamine-related deaths do not get a drug-related diagnose in the official register. Furthermore, the increase in death due to natural causes among drug addicts is not reflected in the official mortality register.

Sweden therefore plans to establish a surveillance register with national coverage of drug-related deaths in the same manner as the SR to act as a complement to the official mortality register. There is also a discussion about how to change the cause-of-death certificate and add a “tick-box” to indicate if

a case of death is related to narcotic drugs. Both these recommendations are proposed by the Swedish Commission on Narcotic Drugs to the Board of Social Welfare. One of the main reasons for making these recommendations is to create an instrument for better knowledge about drug-related deaths and risk situations and how to prevent these in the future.

The future trend in drug-related mortality in Sweden is hard to predict. One finding in the Stockholm Register was that the number of deaths in connection with heroin injection was quite stable but that the number of deaths due to natural causes and chronic drug use was increasing. There were only 10 deaths among persons under the age of twenty years in the total register of 1212 deaths, but this number will probably change if there is an increase of heroin use among young addicts.

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Chapter 14 Drug-related mortality in Switzerland

JM Corkery and C Buschan

Summary

The early years of the 1990s were a period when there was little increase in the use of drugs in Switzerland. This was followed by a time of increased use, particularly of cannabis. In the mid-1990s there were estimated to be about 30,000 persons dependent on heroin and cocaine.

There are no figures published on drug-related deaths, or even poisonings, based on general mortality registers. However, the Federal Office of the Police records and publishes statistics on 'drug-deaths'. This definition covers persons who have died from an overdose of an illegal substance; drug-dependent persons who have died from a multiple drug overdose; suicides of drug-dependent individuals; and those killed in fatal accidents while 'high' on illicit drugs. It is thought that most overdose deaths are caused by intravenously administered heroin.

The number of overdose deaths rose steadily from 35 in 1975 to about 200 in 1987-8 and then accelerated, peaking at 419 in 1992. Since that time, the number of such deaths has declined at a similar rate, falling to 181 in 1999. The decline is due to the increased use of sterile injecting equipment and the prescribing of heroin and methadone.

About 40% of known AIDS cases acquired the disease through injecting drug use. A similar proportion of deaths of AIDS victims is accounted for by injecting drug use. There was an increase in the number of these deaths from 1980 to 1992, when they levelled off. There is some evidence that such deaths are now declining. Cases of hepatitis infection are increasing amongst injecting drug users. This may lead to increasing numbers of deaths in the years to come.

It would appear that the annual rate of overdose deaths recorded by the police and of deaths of AIDS victims who acquired the disease through injecting drug use improved dramatically between 1994 and 1996. However, this improvement may not apply to other types of drug-related deaths. In order to get a more complete picture, it is necessary to provide data from general mortality, and perhaps special, registers. Information is needed on the types of substances involved in deaths, and demographic data such as age, gender and geographical location. This will enable policy- and decision-makers plan their strategies based on up-to-date evidence and a better understanding of the problem(s).

Die frühen 90er Jahre waren eine Phase geringer Zunahme des Drogenkonsums in der Schweiz. Ihr folgte eine Steigerungsphase, besonders

im Cannabisbereich. Mitte der 90er Jahre ging man von rund 30 000 Abhängigen von Heroin und/oder Kokain aus.

Es gibt keine offiziellen gesamtschweizerischen Statistiken zu den so genannten Drogentoten - oder gar zu Todesfällen durch vorsätzliche Vergiftung mittels Drogen -, die sich auf offizielle Sterbetafeln stützen würden. Einzig das Bundesamt für Polizei publiziert jährlich die ihm gemeldeten "Drogentoten". Die angewandte Definition umfasst Tod durch Überdosis eines illegalen Suchtmittels, Tod durch Überdosis eines "Drogencocktails", Selbstmord Drogenabhängiger, Tod durch Unfall infolge Konsums, respektive unter Einfluss illegaler Drogen. Man geht davon aus, dass die allermeisten Drogentodesfälle durch Überdosis nach intravenösen Heroinkonsum auftreten.

Die Zahl der Drogentoten stieg stetig von 35 im Jahre 1975 auf rund 200 in den Jahren 1987/88, um dann immer schneller dem Höhepunkt von 419 im Jahre 1992 zuzustreben. Seit dann sinkt die Kurve ständig und fiel 1999 auf 181 Drogentote. Dies ist in erster Linie dem vermehrten Gebrauch sterilen Injektionsmaterials sowie der ärztlich kontrollierten Verschreibung von Methadon oder Heroin zu verdanken.

Rund 40% aller registrierten Aids-Fälle wurden durch HIV-Ansteckung beim intravenösen Drogenkonsum verursacht. Ein etwa gleich hoher Anteil an Aids Erkrankter und schliesslich Verstorbener konsumierte intravenös. Diese Todesart nahm zwischen 1980 und 1292 stetig zu, um sich dann zu stabilisieren. Inzwischen gibt es Anzeichen dafür, dass auch dieser Anteil an Drogentodesfällen wieder abnimmt. Die Zahl der Fälle von Hepatitis-Ansteckung unter intravenös Konsumierenden nimmt hingegen zu. Dies könnte zu einer wieder zunehmenden Anzahl von Drogentoten in den nächsten Jahren führen.

Es scheint, als ob die jährliche Zahl der von der Polizei registrierten Drogentoten durch Überdosis und/oder Aids, respektive durch HIV-Ansteckung bei intravenösem Drogenkonsum, in den Jahren 1994/96 dramatisch sank. Es muss offen bleiben, ob diese Abnahme sich auch auf andere Todesfälle durch oder nach Drogenkonsum erstreckt. Um ein vollständigeres Bild über die wahre Situation zu erhalten wäre es unter Umständen nötig, spezielle gesamtschweizerische Register zu diesen besonderen Todesarten zu führen. Dabei müssten deutlich mehr Informationen einfliessen wie zum Beispiel über alle effektiv verwendeten Betäubungsmittel, über Geschlecht, Alter, lokale Situation, usw. Diese verfeinerten statistischen Grundlagen würden Entscheidungsträger und Meinungsmacher zum Beispiel in Politik, Sozial-/Bildungswesen und Polizei in die Lage versetzen, ihre Präventions-und Therapiestrategien auf aktueller und wissenschaftlich gesicherter Basis zu erarbeiten. Ausserdem trügen präzisere Angaben dazu bei, die Grundproblematik der Suchtmittelabhängigkeit noch besser zu verstehen und Drogentodesfällen noch effektiver als bisher vorzubeugen.

Les années de tôt du 1990s étaient une période quand il y avait petit accroissement de l'emploi de drogues en Suisse. C'était suivi par un temps d'emploi augmenté, particulièrement de cannabis. En 1995, il y avait estimés être près de 30,000 personnes dépendant de l'héroïne et de la cocaïne.

Il n'y a pas de chiffres publiés sur les décès liés aux drogues, ou même les empoisonnements, basés sur des registres généraux de mortalité. Cependant, le Bureau Fédéral de la Police enregistre et publie des statistiques sur morts par drogue. Cette définition comprends des personnes qui sont mortes d'une overdose d'une substance illégale; la drogue - dépendantes personnes qui sont mortes d'une overdose multiple de drogue; les suicides de drogue - dépendants individus; et ceux-là tuaient dans des accidents fatals tandis que extatique ('haut') sur des drogues illicites. Il est pensée que plus de morts d'overdose sont causées par l'héroïne gérée dans les veines.

Le nombre de morts d'overdose montaient fermement de 35 en 1975 à près de 200 en 1987-8 et puis accéléraient, culminant à 419 en 1992. Depuis ce temps, le nombre de telles morts a baissé à un taux similaire, tombant à 181 en 1999. La baisse est due à l'emploi augmenté d'équipement stérile d'injection et le prescrire d'héroïne et de methadone.

Près de 40% de cas connus du SIDA acquéraient la maladie par injecter de drogue. Une proportion similaire de morts de victimes du SIDA est rendue compte de l'emploi de drogue injecté. Il y avait un accroissement du nombre de ces morts de 1980 à 1992, quand ils nivelaient de. Il y a une certaine évidence que de telles morts baissent maintenant. Les cas d'infection d'hépatite augmentent parmi les utilisateurs injectants de drogue. Cela peut conduire augmenter des nombres de morts dans les années à venir.

Il paraîtrait que le taux annuel de morts d'overdose enregistrées par la police et de morts de victimes du SIDA qui acquéraient la maladie par l'emploi injectant de drogue améliorait dramatiquement entre 1994 et 1996. Cependant, cette amélioration ne peut pas appliquer à autres types de morts liés aux drogues. Pour obtenir une description plus compléte, il est nécessaire à fournir données de registres générales de mortalité, et peut-être spéciales. L'information est requise sur les types de substances impliquée dans des morts, et données démographiques telles qu'âge, sexe et emplacement géographique. Cettes informations permettront les qui faissant les politiques et les décisions planifient leurs stratégies basés sur l'évidence très récente et un meilleurs compréhension du problème(s).

Introduction

Switzerland is a federation of 20 cantons and 6 half-cantons. The country is bordered by Germany, Liechtenstein, Austria, Italy and France; and as such it is a transit country for and consumption of South American cocaine and Southwest Asian heroin. It has a highly developed market-oriented economy based on international trade and banking as well as manufacturing. Tourism is a major source of income.

The Federation's territory covers 41,300 km^2. The population rose steadily during the 1990s from 6,911,000 in 1992 to 7,275,467 in July 1999. Nearly one million of this population is of foreign nationals, mainly composed of guest workers from Italy, France and Spain. Nearly a quarter of the 36,331 persons convicted of consuming drugs in Switzerland during 1997 were of foreign nationality domiciled in the country. The highest concentrations of such offenders were in the cantons of Zurich, Berne and Vaud (Office fédéral de la police 1998). Although the average population density is 171 persons per km^2, this increases to more than 270 in the Mittelland. The federal capital is Berne (128,442 population in 1995); the other main centres of population are Zurich (342,872); Basel (175,561); Geneva (172,737); and Lausanne (116,795). Thirty-two per cent of the population still live in rural areas. The annual population growth rate in 1999 was 0.2%, somewhat lower than the 1% of the mid-1990s. Children under the age of 15 account for 17% of the total population (with a ratio of 1.05 boys to girls). About two-thirds (68%) of the population are aged 15 to 64 (with a 1.04 male to female ratio). The remaining 15% of the population is aged 65 and over, with a much reduced male to female ratio of 0.68. However, the overall ratio of males to females is 0.98.

According to survey data from 1992-3, about one in four men and one in ten women aged 15-39 years had ever used illegal drugs (see Table 14.1). However, these data give only a partial picture of the real consumption of illegal drugs since regular users were under-represented in the sample. Cannabis was far more widely used than any other drug. Surprisingly, the survey suggested that cocaine had been tried twice as much as heroin, and that its level exceeded that of hallucinogens or amphetamines.

The same survey found that the number of individuals using drugs at least once a week during the year previous to the survey was about 48,000. Whilst cannabis was the most commonly used drug, cocaine was overtaken by both heroin and methadone (Table 14.2).

Table 14.1. Lifetime use of illegal drugs by persons aged 15-39, Switzerland, 1992/3 (*Source*: After Fahrenkrug *et al* 1995)

Type of drug	Male		Female		All persons	
	No	%	No	%	No	%
Any drug	278,000	22.0	149,400	11.5	427,400	16.7
Cannabis	271,000	21.5	144,100	11.1	415,300	16.3
Heroin	23,600	1.9	8,900	0.7	32,500	1.3
Cocaine	44,600	3.5	23,500	1.8	68,100	2.7
Methadone	6,900	0.5	3,700	0.3	10,600	0.4
Crack	400	0.0	1,200	0.1	1,600	0.1
Amphetamine & other stimulants	19,500	1.5	7,800	0.6	27,300	1.1
Hallucinogens	37,900	3.0	15,000	1.2	53,000	2.1
Other drugs	9,300	0.7	3,800	0.3	13,100	0.5

Table 14.2. Regular use (at least once per week during the last year) of illegal drugs by persons aged 15-39, Switzerland, 1992/3 (estimated numbers) (*Source*: After Fahrenkrug *et al* 1995)

Type of drug	Male	Female	All persons
Cannabis	11,200	36,700	47,900
Heroin	1,700	1,700	3,400
Cocaine	1,000	700	1,700
Methadone	1,800	1,100	2,900

Note: All other substances less than 0.02%

Most experts agree that there was no significant rise in using drugs between 1990 and 1993. However, the Swiss Health Survey 1997 indicated that the proportion of people aged 15-39 years who had ever tried cannabis rose from 16% to 27% (Table 14.3). The proportion of regular users rose sharply in the 15-19 age group - from 6.5% to 11.2% - and in the 20-24 age group - from 7.6% to 13.5% (Spectra 1998).

In recent years increased efforts have been made to use the number of charges brought against drug users by the police (plaintés) and drug-related deaths to estimate the number of users of hard drugs. Estermann *et al* (1996) found a hard core of 30,000 dependent persons out of a total of 60,000 users of heroin and cocaine (see also Rehm 1995). About 16,000 addicts are enrolled on methadone maintenance programmes (Weber 2000).

Table 14.3. Lifetime use of illegal drugs by persons aged 15-39, Switzerland, 1992/3 and 1997 (%) (*Sources:* Swiss Federal Statistical Office, and Swiss Institute for the Prevention of Alcohol and Drug Problems)

Type of drug	1992/3	1997
Any drug	16	2
Cannabis	16	2
Heroin		
Cocaine		
Methadone		
Amphetamines & other stimulants		
Hallucinogens		
Ecstasy		
Other drugs		

Data collection on DMDs

Determining the cause of death is often difficult when it is associated with the use of illegal drugs. In the majority of cases, one cannot establish with certainty if a death is a case of overdose, the consequence of prolonged use of drugs, an accident or suicide under the influence of consumed substances, or a poisoning resulting from mixing different drugs. Similarly, one can never know with complete confidence if a death should be ascribed to miscalculation on the part of the consumer with regard to the potency of the drug, or whether the social environment in which it was taken, or the poor state of the person's health also played a part.

No statistics specifically relating to drug-related deaths, or even drug-related poisonings, based on the generality population mortality registers are published. Neither would there appear to be any published data on the survival rates of registered addicts. If such data were available it would facilitate comparison with other countries, particularly neighbouring ones. Such information would also provide a more comprehensive picture of drug-related deaths in Switzerland.

The only official Swiss drug-related mortality statistics so-designated are published by the Federal Office of the Police. The definition of what constitutes a drug-related death recorded by the police is that of 'Drogentodesfälle' (literally 'drug-death'). This covers those who have died from an overdose of an illegal substance; drug-dependent persons who have died from a multiple drug overdose (including at least one illegal substance);

suicides of drug-dependent individuals; and those killed in fatal accidents while 'high' on illicit drugs (Blättler 1998).

Thus, the police concept of a drug-related death is somewhat narrower than the definition used by every canton. For these authorities, a drug-related death is (1) a death caused by intoxication by a lethal dose of illicit drug(s) whether willingly (suicide) or unwillingly (murder); and/or (2) a death caused by drug consumption-related diseases (e.g. hepatitis, AIDS); and/or (3) an accidental death caused by driving or working under the influence of illegal drug(s). It is thought that most so-called overdoses in Switzerland are caused by intravenously administered heroin. However, no statistics are published giving details of the substances involved in 'overdose' deaths.

Every 'unnatural' death automatically has to be examined by police forces to exclude any possible criminal involvement by third parties. In each case thus designated unnatural, toxicological and post mortem investigations are conducted by specialist legal medicine institutes. The main responsibility for deciding whether a death is drug-related lies with the senior police officer on duty and on site. The quality of his decision depends on his actual and personal knowledge of such deaths. It is not clear (a) if a definitive and detailed set of criteria is available for use by the police, and (b) if so, whether they are uniformly followed. This means there is a potential danger of errors, but these can be minimised by professional training and frequent instructions to officers. Some days or weeks after an incident, written information on a standardised form is sent to the Federal Office of the Police from the cantonal police headquarters and/or medical doctors and/or legal medicine institutes involved in the case. If there are no clear indications of an overdose, a death will not be recorded by the police as drug-related.

Results

DMDs recorded by the police rose steadily from 35 in 1975 to 200 around 1987-8. Thereafter the rate of increase accelerated, peaking at 419 in 1992. Since that time the number of deaths has fallen back at a similar pace, dropping to 181 deaths in 1999 - the lowest since 1986 (Table 14.4). It is thought that the main reason for the decreasing number of such deaths recorded by the police since 1994 is the strict application of the Swiss Government's four-fold drug policy - particularly the use of sterile needles and syringes (including in prisons) and the Swiss police not confiscating sterile injecting equipment.

Table 14.4 DRDs recorded by Swiss police, 1975-1999 (*Source:* Department of Justice and Police, press release, 30 March 2000)

Year	Number	Year	Number	Year	Number
1975	35	1984	133	1993	353
1976	52	1985	120	1994	399
1977	84	1986	136	1995	361
1978	85	1987	196	1996	312
1979	102	1988	205	1997	241
1980	88	1989	248	1998	210
1981	107	1990	280	1999	181
1982	109	1991	405		
1983	144	1992	419		

The prescribing of methadone and heroin has also contributed to the reduction in overdose deaths. During a period of open drug trafficking in Zurich (Platzspitz, Letten Station) and Berne (Kocher-Park) there was a marked increase in drug-related deaths. Following the go-ahead by the Federal Council for the prescribing of heroin the number of deaths fell. The Swiss Parliament passed a bill on 8 October 1998 that authorises the prescription of narcotics to a clearly defined group of severely addicted drug users in specialised treatment centres. The bill was valid until the end of 2004, subject to a national referendum in June 1999. However, the definitive and permanent introduction of the medical prescribing of narcotics as a treatment/therapy for drug users depends on the revision of the Swiss Federal Law on Narcotics. This would give heroin the same status as the prescribed substitutes morphine and methadone which are used in treating drug addicts. This treatment is only made available to those persons who are long-term drug dependent and for whom other treatments have proved unsuccessful.

In recent years the majority of deaths have involved persons aged over 26 (Table 14.5). The ratio of males to females in 1999 was almost 4:1 at 78% (compared to 77% in 1997). The canton with the highest number of deaths in 1999 was Zurich (45) followed by Berne (32), Basel (19), Vaud (16), with St Gallen and Ticino each having 10 deaths. Over the period 1994-9, Zurich, Berne, Basel and St Gallen (chiefly the cities in these cantons) have consistently had most of the overdose deaths in Switzerland. This is probably not surprising given that they contain some of the highest concentrations of population in the Swiss Federation. However, it is noticeable that other large centres of population such as Geneva and Lucerne have very few such deaths by comparison (6 and 2 deaths respectively in 1999). However, when rates per 100,000 population are calculated a different picture emerges. Basel has as rate of 9.4, followed by Lucerne on 5.8 whilst Geneva has a rate

of only 1.5; Zurich and Berne fall somewhere in the middle of this range (Table 14.6).

Table 14.5. Overdose deaths recorded by the police, by age and gender, Switzerland, 1999 (*Source:* Federal Office of the Police, press release, 30 March 2000)

Age (years)	Male	Female	All persons
15-16	1	0	1
17-18	1	0	1
19-20	4	3	7
21-22	11	3	14
23-24	6	1	7
25-26	16	2	18
27>	103	30	143
All ages	142	39	181

Table 14.6. Overdose death rates per 100,000 population for selected Swiss cantons, 1999

Canton	Number of deaths	Population (1998)	Rate per 100,000 population
Zurich	45	1,187,600	3.789
Berne	32	941,100	3.400
Basel	19	256,800	7.399
Vaud	16	611,600	2.616
St Gallen	10	444,900	2.248
Ticino	10	306,200	3.266
Geneva	6	389,900	1.539
Lucerne	2	343,300	5.826

Methadone-related deaths in Geneva

Perret *et al* (2000) using figures from the Health Authority, police inquests and telephone surveys estimate there are in excess of 2500 addicts in Geneva. The addicts are dependent on heroin, cocaine, cannabis and benzodiazepines; about half of them are in treatment. The number of addicts in methadone maintenance programmes doubled in Geneva between 1990 and 1998, rising from 637 to 1464.

A previous study had found a small increase in the rate of fatal methadone intoxications between 1987 and 1993 (La Harpe and Frick 1995). In view of the increasing use of methadone prescriptions, it was felt appropriate to see whether this had resulted in more deaths involving the drug. All cases in which methadone and/or morphine were found at postmortem by the Geneva Department of Forensic Medicine between 1994 and 1998 were systematically reviewed. Cases were chosen on the grounds that the only cause of death was a potentially fatal drug concentration in the postmortem blood sample.

Out of the 106 such cases, 36 had a methadone-positive toxicology. The median age was 27 (range 16-58 years); most were male. Pulmonary oedema and acute haemostasis of all organs was found in 33 cases; hepatic pathology was present in 26 cases. Nine cases had died after they had left methadone treatment for at a week; 14 cases whilst still in treatment, and 13 had no recorded history of methadone treatment. The mean period of methadone treatment was 2 years at the time of death.

Twenty-one deaths were attributable to methadone intoxication alone, seven cases to methadone with other drug intoxications, and eight deaths to morphine or other drug intoxications. Half of the cases had benzodiazepines in the postmortem blood, 39% morphine, 30% alcohol and 17% cocaine.

The number of fatal methadone intoxications alone ranged from 3 to 5 each year between 1994 and 1998. There were only 1 or 2 deaths each year involving methadone in conjunction with other drugs. This pattern is in contrast with that shown in England and Wales during the same period but is more line with that in Scotland (see Chapter 15). The proportion of deaths through intoxications attributable to methadone in Geneva was 19.8%, compared to 13.5% in Zurich between 1989 and 1997 (Hauri-Bionda *et al* 1999).

These results were unexpected; a rise in deaths involving methadone had been anticipated because of increased prescribing. However, prescribing in Geneva is carried out under very strict medical control, and the MMT programmes play a crucial role. The majority of fatal methadone intoxications in this study appear to have been due to diverted or illegal methadone in association with medications or other drugs used illicitly - a picture not that dissimilar to the one prevailing in Great Britain.

HIV/AIDS

Doctors report HIV/AIDS cases to the Federal Office for Public Health. This office publishes regular information on the number of new cases diagnosed, their origin and outcome. Positive tests declared by laboratories and other complementary tests showed some variation in the period from 1985 to 1992, but since that period the number of such tests proving positive have steadily declined. The proportion of persons acquiring the infection through injecting drugs has fallen at the same rate, standing in 1998 at one-third of its 1990 level (Table 14.7). Females normally account for about one-third of complementary tests proving positive.

About one-third of men acquire AIDS through intravenous drug taking; the rate of infection for women through this route is almost double that for men. About 40% of the 6489 known AIDS cases at the end of 1998 acquired the disease through injecting drug use. It may be worth noting that of this figure of 2609 cases, 189 (7.24%) were of Italian nationality (Federal Office of Public Health 1999, Table 8.1.9). Spanish cases accounted for 2.06% (54) and German nationals for 0.92% (24 cases). The overwhelming majority of cases were Swiss nationals.

Table 14.7. HIV cases in Switzerland, 1985-1999 (*Sources:* Federal Office of Public Health (1999 Tables 8.2.1 and 8.2.2; 2000))

Year of test/ 1st positive test	Declared by laboratories	Complementary tests		
		Number	% IDU	% Female
1985	2,800	545	68.4	31.4
1986	3,252	464	61.6	36.9
1987	1,807	461	54.9	36.4
1988	1,660	866	46.5	38.2
1989	1,956	937	38.5	30.7
1990	1,871	817	32.8	29.9
1991	2,144	683	29.9	41.2
1992	1,909	711	26.6	23.8
1993	1,600	590	28.0	26.7
1994	1,389	537	22.0	33.9
1995	1,019	517	19.5	30.7
1996	923	462	19.1	29.5
1997	834	492	15.2	24.0
1998	657	393	11.7	28.3
1999	603			
2000 (to 31/7)	333			
Total (31/12/98)	24,757 (to 31/7)	8,475	34.6	32.8

Little information has been published on the number of AIDS deaths related to injecting drug use. Using information from Estermann *et al* (1996) and some data gleaned from official publications (e.g. SFA-ISPA 1997), it has been possible to construct a time series of overall numbers of such deaths for the period 1980-94 and 1996. This shows an increasing number of deaths, especially from 1988, with a levelling out occurring in 1992-4 (Table 14.8). The figure of 196 for 1996 would suggest that deaths have now started to fall in line with other categories of death from AIDS. However the proportion of all AIDS deaths which is accounted for by injecting drug use appears to have remained fairly constant at around two-fifths between 1988 and 1996.

Table 14.8. AIDS deaths from injecting drug use, Switzerland, 1983-1996 (*Sources*: Table 8, Estermann *et al* (1996), SFA-ISPA (1997))

Year	AIDS Deaths	AIDS deaths from IDU	% IDU
<1983	7	1	14.3
1983	8	0	0.0
1984	13	1	7.7
1985	32	5*	15.6
1986	63	11	17.5
1987	84	19	22.6
1988	201	79	39.3
1989	301	122	40.5
1990	372	161	43.3
1991	447	175	39.1
1992	585	262	44.8
1993	620	261	42.1
1994	686	292	42.6
1995	647	-	-
1996	450	196	43.6

** SFA-ISPA gives 13*

Addiction experts estimate that each year some hundreds of individuals succumb to hepatitis after having used infected injecting equipment. The numbers quoted have been very vague and tended to reduce in recent years as the general health/survival of addicts has improved. In 1999, more than 40% of all registered hepatitis B infections were accounted for by intravenous drug users; about 60% of all registered hepatitis infections are accounted for by this group. Of the 1353 cases of registered Hepatitis B in 1999, 203 were described as acute. For Hepatitis C the proportion was 69 out of 3011. The number of infections of Hepatitis B appear to have been stable over the period

1996-9, but Hepatitis C numbers are increasing. This may lead to increasing numbers of deaths of addicts in the decades to come.

Using the police drug-related death figures and figures for deaths from AIDS acquired through injecting drug use, Blättler (1998) concludes that the mortality rate in the general population was 0.097% in 1992. The rates for 1993 and 1994 were 0.088% and 0.099% respectively. These figures yield an annual rate of 9 to 10 drug-related deaths per 100,000 population. Using the same approach, the authors calculate that the rate in 1996 was 5.3 per 100,000 population - a much improved state of affairs.

Conclusions

There is some limited information on drug-related deaths in Switzerland, but this is based on only a subset of such cases - those recorded by the police. Although these show a fall in recent years, it is not totally clear if this decline is an actual one or whether there may have been changes in recording practices, for example.

Publication of data from general population mortality registers, broken down by ICD code or underlying cause(s) would be most beneficial - especially if such details as age, gender, location, drug(s) involved (including alcohol) were presented. Equally useful would be more easily accessible data on deaths from the more indirect effects of drug-taking e.g. infections such as HIV/AIDS, hepatitis C and D. Consideration should also be given to tracking the survival rates of registered addicts, if not already being done.

The provision of this more detailed information would give Swiss policy makers and drug workers the tools they need to monitor effectively the policies, treatments and prescribing practices they have in place, and if necessary change them.

On a more positive note, there are very encouraging signs of significant decline in the number of AIDS deaths related to injecting drug use, although the proportion of all AIDS deaths they account for remains high. In the future it may well be that deaths resulting from hepatitis may be more important. Cases of such infections will need to be as closely monitored as HIV/AIDS ones already are.

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Chapter 15 Drug-related mortality in the United Kingdom

J M Corkery

Summary

UK drug-related death statistics up to 1995 are discussed first. Data on deaths of AIDS victims and those with hepatitis C who acquired the infection through injecting drug use are then presented. Since three separate national government departments are responsible for collecting and analysing mortality data, the information derived from these sources will be presented in turn. In doing so, reference will be made to appropriate matters of concern. Issues surrounding the production of UK wide statistics are then briefly discussed. This is followed by an examination of the work of the National Programme on Substance Abuse Deaths.

A discussion then follows of the work undertaken with regard to reducing drug-related deaths by the Prevention Working Group of the Advisory Council on the Misuse of Drugs, with particular reference to their recommendations concerning official statistics and other information pertaining to the issue from special registers. A technical working group has been set up to take forward these concerns.

Introduction

The United Kingdom (UK) is made up of four separate countries - England, Wales, Scotland and Northern Ireland. There are three separate legal systems and government departments responsible for collecting and publishing information on drug-related deaths from General Mortality Registers. Such differences are also reflected in the way in which statistics on such deaths are compiled. It is therefore necessary to deal individually with the constituent parts of the UK.

Before looking at the nature and extent of drug-related deaths, it is necessary to examine briefly some of the relevant information concerning the UK drugs problem. Three main sources are discussed in this section: statistics of those dependent on drugs who are seeking treatment; statistics on HIV/AIDS and hepatitis cases; and crime surveys covering those aged 16 to 59 in the general population.

Treatment of those dependent on drugs

The number of individuals presenting for treatment in England during the six months ending September 1997 fell by 15% from 25,925 to 21,996, following a steady upward trend. This fall was thought more likely to have occurred because of changes in reporting practices following the closure of the Home

Office Addicts Index, rather than being a real decline in the number seeking treatment. This belief is supported by the fact that there was a 9% increase to 23,916 in the 6-month period ending March 1998, followed by a further increase of 20% to 28,599 in the 6-month period ending September 1998. A year later, the figure had risen to 30,545.

Just over half (52%) of those presenting in the most recent six-month period were in their 20s and one in seven (15%) aged under 20 years. The ratio of male to female was 3:1, in line with the previous trend. Heroin was by far and away the most often reported main drug used (59%), followed by cannabis (11%), methadone (9%), amphetamines (8%) and cocaine (7%). Just under half (45%) of users reported misusing only one drug. The overall use of cocaine reported by users across Great Britain rose from 15% to 18% in the 12 months ending September 1999.

Where injecting behaviour was known, 63% of users had ever injected compared to 44% in the last 4 weeks. Injecting was more likely among men and older users. Nearly half (47%) of new agency episodes were reported by community based drug services, 36% from non-statutory services, 6% from National Health Service (NHS) funded General Practices, and 5% from Drug Dependency Units. Tables 15.1 and 15.2 give figures for Great Britain by various breakdowns.

Table 15.1. Age and gender of users starting agency episodes in 6 months ending 30 September 1999, Great Britain (*Source*: Table C2, DH (2000))

Age group	Male	Female	All persons
<15	216	74	290
15-19	3,657	1,683	5,340
20-24	7,433	2,844	10,277
25-29	7,154	2,317	9,471
30-34	4,928	1,523	6,451
35-39	2,524	788	3,312
40-44	1,089	344	1,433
45-49	548	173	721
50-54	183	70	253
55-59	52	34	86
60-64	12	13	25
64>	14	8	22
All ages	27,810	9,871	37,681

Table 15.2. Drugs of misuse by category and whether injecting the drugs, for users starting agency episodes in 6 months ending 30 September 1999, Great Britain (*Source:* Tables C7 and C8, DH (2000))

Type of drug	% of users of each drug as a % of total number of users	% injecting where injecting status was known	Number of users
Heroin	64	58	24,220
Methadone	20	7	7,581
Other opiates	9	8	3,357
Barbiturates	0	19	44
Benzodiazepines	23	3	8,631
Amphetamines	15	44	5,487
Cocaine	18	12	6,756
Hallucinogens	1	4	457
Cannabis	30	-	11,240
Solvents	1	-	315
Alcohol	12	0	4,523
Anti-depressants	2	0	653
Other drugs	8	10	2,848
Drug free/no drug coded	0	-	42

HIV//AIDS and hepatitis statistics

The Public Health Laboratory Service AIDS Centre (PHLS) and the Scottish Centre for Infection and Environmental Health (SCIEH) publish a bulletin giving information on AIDS and HIV in the United Kingdom. It appears that about 6% of AIDS cases are accounted for by heterosexual injecting drug users, and a further 2% by homosexual injecting drug users. Ten per cent of HIV cases were contracted by heterosexual injecting drug users, and a further 2% by homosexual injecting drug users. Table 15.3 gives details of such cases by gender and region. At least 90% of AIDS cases are white. Around four-fifths of male AIDS cases acquiring the infection through injecting drug use are aged 20-39 compared to about a half of female AIDS cases. The proportions of HIV cases acquired through injecting drug use accounted for by this age group are slightly higher for both genders.

Table 15.3. HIV and AIDS cases by region of report – injecting drug use, UK June 2000 (*Source*: Tables 5a and 5b, PHLS and SCIEH (2000))

Region	AIDS		HIV	
	Male	Female	Male	Female
England				
Northern and Yorkshire	19	8	64	30
North West	41	16	113	48
Trent	28	11	102	36
West Midlands	9	6	56	21
Eastern	32	9	96	31
London	286	121	950	481
South East	61	20	194	70
South West	19	11	79	35
Total	495	202	1,654	752
Wales	7	4	22	7
Northern Ireland	1	2	4	3
Scotland	257	103	803	355
United Kingdom	760	311	2,483	1,117
CI/IOM	0	0	4	4

The number of new AIDS cases where the disease was acquired through injecting drug use (whether amongst heterosexual or homosexual persons) is described in Table 15.4. There are distinct differences between the constituent parts of the UK as regards the proportion of new AIDS cases notified in which the disease was contracted through injecting drug use. Whilst the overall UK average is 8%, the rate in Northern Ireland is only 3.6% and that in England and Wales is 6.2%. However, in Scotland the rate is very highly elevated - at 37.1%. This, no doubt, reflects the disproportionately high rate of serious/problem drug users in Scotland.

Table 15.4. New AIDS cases notified (acquired through injecting drug use), UK, to end of June 2000 (*Sources:* Unpublished data from CDSC and SCIEH)

Year	England & Wales	Northern Ireland	Scotland	UK
< 1985	3	0	0	3
1985	7	0	0	7
1986	15	0	1	16
1987	29	0	3	32
1988	39	0	6	45
1989	49	0	24	73
1990	80	0	25	105
1991	72	0	35	107
1992	79	0	24	103
1993	123	1	54	178
1994	129	0	56	185
1995	126	2	50	178
1996	113	0	30	143
1997	59	0	36	95
1998	43	0	18	61
1999	24	0	14	38
2000	9	0	1	10
Total	999	3	397	1,379

Prevalence data for hepatitis B and C antibody (HBV and HCV) are available for England and Wales from the Unlinked Anonymous Prevalence Monitoring Programme survey of injecting drug users. There has been no consistent trend over recent years in the proportion of cases being hepatitis B core antibody positive (Table 15.5). However, laboratory reports of acute hepatitis B infection show an upward trend between 1994 and 1999, more than doubling in that period. The level of hepatitis C antibodies has been screened for since 1998; these have been considerably higher than those for hepatitis B.

Up to the end of 1999, 5,719 (56%) of a total 10,161 known cases in Scotland of hepatitis C antibody positivity had used drugs (Codere and Shaw 2000). Three-quarters (2,793 cases) of these were aged between 15 and 44 at the time of testing - the age range within which most injecting drug users are found. Up to 1993 the proportion of persons acquiring the infection through injecting drug use rose sharply, peaking at 62.6%. Since that time the proportion has varied between 54.2% and 62.3% (Table 15.6).

Table 15.5 Hepatitis B and C antibody prevalence rates, England and Wales, 1994-1999 (*Source*: Derived from Table 2, CDSC (2000))

	1994	1995	1996	1997	1998	1999
Injecting drug users who began injecting in last 3 years						
Hepatitis B core antibody +	10%	5.2%	6.8%	3.4%	5.0%	5.4%
	71/678	26/501	44/646	20/583	37/742	46/848
Hepatitis C antibody +					8.5%	9.0%
					63/743	76/849
Injecting drug users aged less than 25 years						
Hepatitis B core antibody +	11%	5.9%	8.4%	3.7%	5.5%	4.5%
	103/908	38/646	68/809	24/647	46/835	42/938
Hepatitis C antibody +					11%	12%
					93/835	108/938
Laboratory reports of acute hepatitis B infection in injecting drug users						
	102	147	166	192	251	226*

**Provisional*

Table 15.6. Persons in Scotland reported to be hepatitis C antibody positive by earliest positive specimen, to end of 1999 (*Source:* Derived from Table 2, Codere and Shaw (2000))

Year	All specimens	Injecting drug users	IDU as % of total
< 1991	66	16	24.2
1991	275	61	22.2
1992	381	143	37.5
1993	519	325	62.6
1994	830	450	54.2
1995	1,125	624	55.5
1996	1,236	738	59.7
1997	1,494	848	56.8
1998	2,052	1,156	56.4
1999	2,009	1,251	62.3

Total	10,161	5,719	56.3

General population crime surveys

The Home Office and the Scottish Office conduct regular surveys of people's experience of crime. One component of these explores self-reported drug misuse. At the time of writing, the most recent published report covers the 1998 survey in England and Wales (Ramsay and Partridge 1999). These surveys are perhaps the best measure of prevalence of drug misuse in Great Britain on the part of the general population. Main points emerging from the 1998 British Crime Survey were as follows:

- Young people aged 16 to 29 reported the highest level of drug misuse: 49% indicated they had taken a prohibited drug at some time. Only 25% of 16 to 29 year olds had taken drugs within the last year, with just 16% having done so within the last month.

- Levels of drug misuse were relatively stable across England and Wales between 1994 and 1996. This stability generally persisted between 1996 and 1998. However, there were some exceptions.

- Cannabis was still the most widely consumed prohibited drug. But there was a significant increase between 1996 and 1998 in the use of this drug by young men aged 16-29, whose prevalence rate for the last year rose from 25% to 29%. The equivalent rate for females remained unchanged at 17%.

- Of more importance, however, was the significant increase between 1996 and 1998 in the use of cocaine on the part of both the 16-29 and 16-24 age groups, for all three recall periods (lifetime, last year, last month).

The 1994 BCS came up with the following 'best estimates' of the number of people aged 16 to 59 in England and Wales who could have tried four specific substances (Ramsay and Percy 1996, Table 4.5).

	Ever	**Last month**
Cannabis	6,307,000	1,486,000
Amphetamine	2,486,000	303,000
LSD	1,324,000	152,000
Ecstasy	728,000	121,000

Best estimates for 16-24 year olds using drugs in the last year and month in England and Wales in 1998 are given below (Ramsay and Partridge 1999, Table B16).

	Last year	**Last month**
Any drug	1,865,000	1,220,000
Cannabis	1,735,000	1,095,000

Cocaine	195,000	65,000
'Opiates+'	195,000	65,000

The picture in Scotland during 1996 was similar to that in England and Wales during that year. The Scottish Crime Survey (Anderson and Frischer 1997) estimated that between 600,000 and 750,000 individuals in the 16 to 59 age group had ever tried illicit drugs. It would appear from the Scottish Crime Survey that in Scotland, heroin, crack and methadone are rarely used, whereas cannabis is widely used. However, in reality these drugs are very widely used – as evidenced by the comparative high number of deaths involving these substances in Scotland. Between 1993 and 1996 there were statistically significant increases in the use of cannabis, and also for cocaine, ecstasy and diazepam. This contrasts with a fairly stable picture in England and Wales between 1994 and 1996. It appears that females in Scotland are less likely to continue using drugs on a regular basis after initial experimentation.

The Northern Ireland Omnibus Surveys for 1996 and 1997 indicate a slight fall from 28% to 24% in the proportion of respondents aged 16-59 admitting to taking at least one illegal drug (Northern Ireland Office 1999). The most commonly used drug at any time in the past was cannabis (20% in 1996 and 16% in 1997). The next most popular drug was tranquillisers (falling from 8% in 1996 to 6% a year later). There was very little experience of crack, cocaine, heroin, methadone and anabolic steroids. After cannabis, males were more likely to use LSD, whilst girls were more likely to use tranquillisers. In 1997, 27% of males and 20% of females had ever taken drugs. There was a statistically significant fall in the percentage of men who had ever taken drugs - down from 37% in 1996. Drug misuse in Northern Ireland is low compared to other parts of the United Kingdom.

UK Drugs Strategy

Both the current UK administration and its predecessor issued Green and White Papers outlining their visions of how the drugs problem in the U. K. should be addressed. Until the current administration came to office, there was a range of bodies, including government departments and other agencies, doing what they considered best to deal with the issues for which they had individual responsibility.

The United Kingdom Anti-Drugs Co-ordination Unit (UKADCU) set out in its 10-year Drugs Strategy a number of aims, which are designed to be measurable. In the present context aim (iii), on treatment, is relevant. The aim is to 'enable people with drug problems to overcome them and live healthy and crime-free lives' (CDCU 1998). Work is currently proceeding to put into place the performance indicators and the appropriate baselines against which progress can be monitored. One of the performance indicators to be used to assess progress in this area is to reduce the number of drug-related deaths. However, before a baseline can be established it is necessary to define what is meant by a drug-related death.

Results

(A) Drug-related mortality in the United Kingdom

The Home Office statistical bulletin on notified addicts included information on drug-related mortality until the series ceased in 1997 (Corkery 1997). The information supplied by the Office for National Statistics (ONS), and the General Register Offices for Scotland and Northern Ireland was extracted from their general mortality registers for specified ICD-9 codes. To these were added deaths of those who died of AIDS acquired through injecting drug use. With the closure of the Addicts Index, the vehicle for the publication of UK drug-related mortality figures disappeared. National Statistics (formerly ONS) are currently considering how future UK statistics will be produced and disseminated.

In 1995 - the last year for which the Home Office prepared the official UK mortality statistics - there were 1810 drug-related deaths nation-wide according to this Home Office definition (Table 15.7). Of these, about 600 were attributed to drug dependence (ICD-9 304) or non-dependent misuse of drugs (other than alcohol or tobacco but including volatile substances - ICD-9 305). Deaths involving poisoning by solid or liquid substances (ICD-9 960-979) were coded also to external cause codes. On this basis, a further 470 deaths resulted from accidental poisoning (E850-E866) by controlled drugs and 260 involved poisoning by controlled drugs where it was undetermined whether the drugs had been accidentally or purposely taken (E980). In addition, some 350 people committed suicide with the aid of controlled drugs (E950). It was believed in 1997 that 150 injecting drug users died from AIDS in 1995. However, as will be seen below, it would appear that this is closer to the level for England and Wales rather than for the UK. Of 17,220 AIDS cases reported in the United Kingdom between January 1982 and June 2000, some 1,379 (8%) probably acquired the virus through injecting drugs – of these, 998 (72%) had died by the end of June 2000.

Of the 602 deaths in 1995 resulting from drug dependence or nondependent misuse of drugs, about 53% used morphine-type drugs (including 19% involving methadone) and about 7% used volatile substances. Fifteen per cent of those who died were under 20 and about four-fifths of these deaths were of people aged under 35.

The main Class A drugs (as defined by the Misuse of Drugs Act 1971) mentioned in accidental poisoning deaths were methadone (154), morphine (97) and heroin (60). Benzodiazepines were involved in one-sixth, and dextropropoxyphene in one-tenth of such deaths. About one-third of suicides caused by poisoning involved at least one controlled drug. These were usually Class C, particularly dextropropoxyphene, benzodiazepines (often diazepam or temazepam), and Class B drugs (mainly dihydrocodeine, codeine and barbiturates).

Table 15.7. Summary of DMDs, by year of registration, UK, 1988-1995
(*Source:* Table 16, Corkery (1997))

Underlying cause of death	1988	1989	1990	1991	1992	1993	1994	1995
Drug dependence and nondependent misuse of drugs[1]	222	245	294	307	345	322	489	602
Deaths where a controlled drug was mentioned[2]								
Accidental	191	202	233	259	329	359	445	470
Suicide	478	433	440	459	414	352	352	327
Undetermined	302	279	262	298	280	256	246	259
AIDS	19	32	55	79	82	110	119	147
Total	1,212	1,191	1,284	1,402	1,450	1,399	1,651	1,805

(1) Includes solvents and other non-controlled drugs such as alcohol

(2) Excludes Northern Ireland before 1991. However, there are very few drug-related deaths in that part of the U K

Table 15.8. Deaths were selected controlled drugs were mentioned on death certificates, UK. 1997 using ONS definition

	England & Wales	Scotland	Northern Ireland	United Kingdom
Methadone	421	91	2	514
Heroin	255	33	0	288
Morphine	255	54	1	308
Other opiate	89	7	0	96
Temazepam	104	34	3	141
Diazepam	122	95	5	222
Nitrazepam	14	2	0	16
Cocaine	38	5	0	43
Ecstasy	11	2	3	16
Other amphetamine	42	7	0	45
Barbiturate	20	4	1	25
Cannabis	13	8	0	21
All drug types	2,858	447	39	3,344

Notes: Figures should not be added together to derive totals. N/A = not available

Table 15.8 draws together information for specific drug types using the ONS definition (see Figure 15.1 below) as well as giving the overall numbers of drug-related deaths for the constituent countries of the UK in 1997.

Whilst there are UK-wide problems with opiates and benzodiazepines, there are regional variations. The provision of detailed breakdowns by country and even regions within countries is essential for a proper understanding of the nature of drug-related deaths.

Detailed information on deaths involving drug abuse (e.g. by age, gender and type of drug) in England and Wales was not published by ONS from 1993 until 1999, although some summary information on poisonings is still routinely published in the DH4 series. For the first time, information on deaths from drug-dependence and nondependent abuse of drugs has been included in the statistics on deaths from injury and poisoning (Stationery Office 1999). Information on deaths from poisoning as well as those having an underlying cause of drug dependence or nondependent abuse of drugs continue to be issued annually in separate publications by GRO(S) and GRO(NI). ONS has now published figures for England and Wales from its drug-related deaths database for the periods 1993-7 and 1994-8 *in Health Statistics Quarterly* (ONS 2000a and b). This publication is likely to be used as one of the main vehicles for the dissemination of such figures in the future. The internet is also likely to be used, as it is in Scotland. Since ICD-10 is going to be used by ONS from 1 January 2001, 1999 and 2000 data will be bridge-coded. Northern Ireland will be also adopting ICD-10 from 2001; data for 2000 will be bridge-coded. ICD-10 was introduced in Scotland at the beginning of 2000; 1999 data are being bridge-coded.

Consideration is currently being given by National Statistics to the need for publishing UK figures. This will include assessing the need for regional and other types of breakdown. Some regional figures for England and Wales have been published by ONS (see Chistophersen *et al* 1998) and have been given in Parliamentary Answers.

Data has been supplied from the UK General Mortality Registers for the annual report of the UK focal point to the EMCDDA for 2000. For the first time, the whole of the UK has been covered; in previous years data were only supplied for England and Wales. Due to insufficient time being available to extract the data according to the complex EMCDDA DRD standard, it was decided to use the ONS 'standard definition' (see Figure 15.1). Unfortunately, Scottish data were not available on a consistent basis for the whole of the period covered (1990-8). Between 1994 and 1998 the number of deaths rose by one-sixth (16.6%), mostly between 1998 and 1999 (Table 15.9). The number of drug-related deaths in England and Wales steadily increased, by 43%, during the 1990s. The number of deaths in Northern Ireland has remained fairly consistent, varying between 28 and 46 per year.

Table 15.9. 'Drug-related deaths' using the ONS standard definition for individual countries within the UK, 1990-1998 (*Source*: Unpublished data from ONS, GRO (Scotland) GRO (Northern Ireland) supplied for UK focal point annual report to EMCDDA.)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998
England and Wales	2,041	2,053	2,287	2,252	2,404	2,563	2,721	2,858	2,922
Scotland	-	-	-	-	422	426	460	447	449
Northern Ireland	39	46	28	28	35	46	40	39	40
UK total	-	-	-	-	2,861	3,035	3,221	3,344	3,411

Notes: England Wales: 1990-2 = registered in year; 1993 onwards = occurring in year

Table 15.10. Deaths of AIDS cases notified by individual countries within the UK, to end of June 2000 (*Sources*: Unpublished data from CDSC and SCIEH)

Year	England & Wales	Northern Ireland	Scotland	United Kingdom
Not known	222	0	0	222
< 1985	66	1	2	69
1985	119	1	1	121
1986	260	0	10	270
1987	339	1	12	352
1988	396	1	17	413
1989	629	7	29	665
1990	737	9	41	786
1991	896	5	95	994
1992	1,025	5	67	1,094
1993	1,264	4	87	1,354
1994	1,426	7	103	1,530
1995	1,389	8	115	1,510
1996	1,140	7	82	1,229
1997	477	3	44	524
1998	315	1	26	341
1999	258	1	22	271
2000	99	0	11	110
Total	11,057	61	764	11,865

As might be expected, the pattern of deaths (whether natural or otherwise) of those infected with AIDS echoes that of new cases notified. By the end of June 2000, there had been 11,865 deaths recorded by CDSC and SCIEH, 68.9% of AIDS patients notified to them. Deaths peaked in England and Wales during 1994, but a year later in Scotland and Northern Ireland (Table 15.10).

Deaths, from whatever cause, of persons who acquired AIDS through injecting drug use peaked in 1995 in England and Wales, and also in Scotland. There have only been a few such deaths in Northern Ireland (Table 15.11). Deaths of IDU AIDS victims accounted for 6.2% of the total number of deaths of AIDS cases in England and Wales up to the end of June 2000. In Northern Ireland the figure was 4.9%, but in Scotland it was 40.8%. Just over 30% of deaths of IDU AIDS victims have occurred in Scotland.

Table 15.11. Deaths of AIDS cases (acquired through injecting drug use) notified by individual countries within the UK, to end of June 2000 (*Sources*: Unpublished data from CDSC and SCIEH)

Year	England & Wales	Northern Ireland	Scotland	United Kingdom
Not known	12	0	0	12
< 1985	1	0	0	1
1985	4	0	0	4
1986	9	0	0	9
1987	9	0	2	11
1988	18	0	1	19
1989	24	0	8	32
1990	41	0	12	54
1991	42	0	38	80
1992	61	0	24	85
1993	83	0	32	115
1994	82	0	49	131
1995	105	1	52	158
1996	96	1	43	140
1997	34	1	21	56
1998	31	0	12	43
1999	29	0	13	42
2000	5	0	4	9
Total	686	3	312	1,001

The number of drug-related deaths using the ONS standard definition can be combined with the number of deaths of persons with AIDS acquired through injecting drug use. The number of so-defined 'drug-related' deaths in the UK has increased from about 3000 in 1994 to nearly 3,500 in 1998 (Table 15.12). The rate of increase appears to be slowing down, due in no small measure to the improved survival of persons with AIDS.

Table 15.12. Drug-related deaths using ONS standard definition and deaths of AIDS victims who acquired the infection through injecting drug use, UK, 1994-1998 (*Sources*: Derived from Tables 15.9 and 15.11)

Type of death	1994	1995	1996	1997	1998
ONS deaths	2,861	3,035	3,221	3,344	3,411
IDUs with AIDS	131	158	140	56	43
Total	2,992	3,193	3,361	3,400	3,454

An increasing area of concern is the potential increase in drug-related deaths posed by Hepatitis C. As has already been seen above, a significant proportion of known cases of this infection has arisen through intravenous drug use. Unfortunately, there is no specific ICD-9 code for hepatitis C. Where the infection is the underlying cause of death, a code in the range 070.4 to 070.9, covering 'other and unspecified viral hepatitis', would probably be assigned. This area will be given further consideration by the General Register Offices.

(B) DRDs in England and Wales

These countries are dealt with together because they share the same legal system and the same government department (National Statistics) that is responsible for publishing mortality statistics.

Role of the coroner

All violent and unnatural deaths, and deaths the cause of which are either unknown or are in serious doubt, as well as all deaths of persons in custody, have to be reported to coroners in England and Wales. Most drug-related deaths are thus caught by these requirements. The few exceptions are deaths due to HIV/AIDS or hepatitis acquired through intravenous drug use. The coroner is an independent quasi-judicial officer appointed by the Crown. His/her primary function is to establish the circumstances and cause(s) of death and to investigate whether there was any criminal involvement.

Usually a coroner's investigation is concluded without the need for an inquest, typically after a postmortem has enabled the coroner to determine the medical cause of death and to establish that the death was not one on which he/she is

required to hold an inquest. By law, there are certain instances in which inquests have to be held. In addition, an inquest may be held if initial investigations suggest the death was unnatural. An inquest enables the coroner not only to seek to ascertain the medical cause of death, but also to determine how, when and where the deceased came by his/her death, and to establish the particulars necessary to allow the death to be registered.

There is much variation in terms of facilities and resources between coroner's jurisdictions. This may mean that toxicological examinations are not routinely conducted. Where the involvement of drugs may not be suspected, such as in traffic accidents, tests may not be carried out. The coroner has a range of information on which to base his/her conclusions: the results of any postmortem and toxicological examinations; the statements of witnesses, friends and relatives; and perhaps the medical and drug history of the individual.

Theoretically, the coroner has a choice of six verdicts (conclusions) which can be returned in cases of drug-related deaths: dependence on drugs; nondependent abuse of drugs; accident/misadventure; suicide; open/undetermined; and homicide. Despite the existence of guidance on the giving of verdicts, there appears to be rather different interpretations of them. Some coroners appear reluctant to record a verdict of suicide preferring to regard the cause of death as open/undetermined. Again, the two specific drug-related conclusions are not used in a consistent way either between or within coroners' jurisdictions.

There were 196,145 deaths reported to coroners in 1998. Of these, inquests were held in 23,568 cases (377 without postmortems). Dependence on drugs was recorded as a verdict in 258 cases, and nondependent abuse of drugs in 237 cases: 4.7 and 4.3 per 10,000 registered deaths respectively (Allen 1999).

The coroner's certificate provides standard details on the deceased such as name, age, gender, date of death, occupation, usual address, cause(s) of death and marital status. Information on whether a postmortem was held and the coroner's verdict are also recorded. In the case of deaths by accident/misadventure the coroner has to supply details of where and how the incident happened. In the cause of death section of the certificate, the coroner may mention any drugs identified but there is usually no indication of the relative quantities or contribution to the death if more than one substance is identified. In most cases the coroner's certificate does not give any indication of drug dependence, whether toxicological tests were carried out, how or where drugs were obtained, where drugs were taken or route of administration. The coroner's certificate is sent to the registrar of births, deaths and marriages who records the death using only the information on that certificate. ONS only receives a copy of the death certificate and part of the coroner's certificate.

ONS drug-related death statistics

ONS has responsibility for registering and compiling official statistics on all deaths, including drug-related ones, in England and Wales. They code all causes of death on the death registration form to ICD-9. Drug-related causes are coded as in Figure 15.1. More details of coding and the problems associated with defining a drug-related death are given in Christophersen *et al* (1998) and the ACMD report (2000). Statistics published are now based on the date of occurrence rather than the date of registration.

Figure 15.1. ONS definition of DRDs (ICD-9)

292	Drug psychosis
304	Drug dependence
305.2 – 9	Nondependent abuse of drugs
E850 – E858	Accidental poisoning by solid or liquid substances – drugs, medicaments, and biologicals
E950.0 – 5	Suicide and self-inflicted poisoning by solid or liquid substances – drugs and medicaments
E980.0 – 5	Poisoning by solid or liquid substances, undetermined whether accidentally or purposely inflicted – drugs and medicaments
E962.0	Assault by poisoning – drugs and medicaments

A database was developed by ONS in 1999 to facilitate research into deaths caused by drug poisoning, and to help in the identification of specific substances involved in such cases. Data from 1993 to 1998 had been added to the database at the time of writing. The statistics published for the period are examined below.

Where drugs were indirectly responsible for a death it is usually the direct cause which is chosen as the underlying cause, e.g. HIV infection or road traffic accident. It should be noted that most deaths due to the indirect and long-term *sequelae* of drug abuse cannot be readily identified at present from the information presented to ONS and are therefore typically excluded from their statistics. It could be argued that deaths from HIV/AIDS and hepatitis acquired through intravenous drug use, as well as from volatile substance abuse (VSA), should be included in any definition of a drug-related death. For example, there were 65 VSA deaths in England during 1997, and none in Wales (Taylor *et al* 2000). In 1998 these figures were 54 and 3 respectively. There were also 39 deaths in 1997 of persons with HIV/AIDS acquired

through IDU (CDSC 1999) - such deaths accounting for 6.7% of all HIV/AIDS deaths in 1997.

The ONS database of drug-related poisoning deaths covers accidents and suicides (including undetermined cases) involving drugs, in addition to poisonings due to drug dependence and abuse of drugs. The range of substances it records is wide, including licit and illicit, prescribed substances, and over the counter medications. The database includes, for each death, every mention of a substance recorded on the death certificate or mentioned by the coroner. The underlying cause of death is recorded as well as other information about the deceased including, age, gender, marital status, occupation, and place of usual residence. There is also an indicator to show if alcohol was mentioned.

Most deaths on the database had a coroner's inquest. The main effect of including additional information from Part V of the coroner's certificate is to increase the proportion of deaths where alcohol was also mentioned and to give extra information on other substances. Figures from the database therefore differ slightly from those released before its development.

Table 15.13 presents information on selected drugs controlled under the Misuse of Drugs Act 1971 mentioned for deaths in 1993-8. During this time more than one drug was mentioned on the death certificate in 20.8% of cases, and alcohol in 21.5% of drug-related deaths. Most deaths are associated with opiates (chiefly heroin/morphine and methadone), often in combination with other drugs and/or alcohol. Large numbers of deaths also involve benzodiazepines such as temazepam and diazepam. However, the types of drug most often mentioned were antidepressants, especially dothiepin and amitriptyline, and paracetamol (which is not a controlled drug) - either on its own or in compound preparations such as distalgesic. By comparison, aspirin was implicated in only about one-tenth of the number of cases involving paracetamol compounds.

Drug-related deaths in England and Wales collated by the ONS for 1994-6 show that men in their 20s and early 30s are more likely to die than men in other age groups and females. This peak is largely attributable to higher death rates from accidental overdoses. Death rates for females are more consistent and at a lower level than males. Deaths from drug dependence and nondependent misuse in women occur mostly amongst young adults. Both men and women in their 80s or older exhibit higher rates of suicidal poisonings.

Table 15.13. Number of deaths where selected substances were mentioned on the death certificate, including with other drugs or alcohol, England and Wales, 1993-1998 (*Sources:* ONS 2000a and b)

	1993			1994			1995			1996			1997			1998			1993-1998		
	Total	with other drug	with alcohol	Total	with other drug	with alcohol	Total	With other drug	with alcohol	Total	with other drug	with alcohol	Total	with other drug	with alcohol	Total	with other drug	with alcohol	Total	other drug	with alcohol
All Deaths	2252	469	445	2404	496	493	2563	529	516	2721	558	612	2858	592	630	2922	634	689	15720	3278	3385
All mentions of Heroin or Morphine	187	61	39	276	78	61	355	93	83	464	113	120	445	112	109	632	164	167	2359	621	579
Heroin	67	14	13	127	31	26	162	33	33	241	51	62	255	47	56	407	93	105	1259	269	295
Morphine	129	48	28	176	51	40	231	68	61	281	74	72	255	78	68	313	83	88	1385	402	357
Methadone	230	92	49	269	110	57	310	130	58	368	141	87	421	152	102	363	165	82	1961	790	435
Cocaine	12	4	0	24	12	4	19	10	2	18	8	5	38	21	5	65	40	18	176	95	34
All amphetamines	36	17	6	46	21	6	48	24	6	47	22	10	50	20	3	64	30	5	291	134	38
MDMA/Ecstasy	8	3	2	27	12	3	10	4	1	16	8	4	11	8	1	15	6	2	87	41	13
LSD	0	0	0	1	1	0	1	1	0	0	0	0	1	1	1	1	1	0	4	4	1
Cannabis	14	12	6	18	16	3	17	16	5	11	11	7	13	12	2	5	5	2	78	72	25
Temazepam	173	115	66	163	95	50	138	102	43	98	67	28	104	78	39	110	82	36	786	539	262
Diazepam	55	45	29	72	64	32	76	68	26	97	91	44	122	111	56	109	105	36	531	484	223
Nitrazepam	23	14	9	18	12	4	17	10	2	11	8	3	14	7	2	6	2	2	89	53	22

Table 15.13. (continued)

Barbiturates	44	11	10	46	10	4	46	8	0	30	10	7	20	6	1	35	12	5	221	57	27
All antidepressants	459	138	75	476	135	79	489	133	81	540	149	89	539	158	98	502	161	102	3005	874	524
Dothiepin	210	51	37	261	58	44	235	56	39	279	60	47	262	60	41	244	60	47	1491	345	255
Amitriptyline	172	58	24	138	51	22	145	32	31	168	54	26	177	61	37	183	68	36	983	324	176
Paracetamol incl. Compounds	463	147	96	468	146	100	526	161	106	480	145	106	562	152	129	517	159	130	3016	910	667
Paracetamol	322	128	56	284	106	49	323	126	44	284	112	55	345	118	71	312	122	57	1870	712	332
Co-proxamol	135	19	36	187	40	49	189	30	54	188	30	44	214	30	57	208	31	70	1121	180	310
Aspirin	65	22	5	53	19	10	50	21	5	56	24	8	51	17	6	41	13	6	316	116	40

Notes: (1) Figures should not be added to give totals. (2) Heroin degrades in the body into morphine.

Nearly half the drug-related deaths amongst young men in 1994-6 were accounted for by opiates. Death rates for opiates fall off at older ages. Amongst elderly men there is an increase in deaths due to barbiturates and tranquillisers and a decline in antidepressants. Opiates account for a lower proportion of female deaths; other painkillers and antidepressants account for about half the drug deaths of women. Deaths from ecstasy, amphetamines and cocaine account for only a small proportion of drug-related deaths. Mortality rates for young adults (15 to 44 years) were significantly higher in London and the north west of England and significantly lower in the West Midlands and Eastern regions.

During 1997 there were 2,144 deaths ascribed to drugs of abuse using the 'restricted' approach i.e. similar to the Home Office classification (excluding AIDS) by ONS: 1,548 male and 596 female (about 0.6% and 0.2% respectively of all deaths occurring in 1997). The overall drug-related death rate for 1997 was 4.1/100,000 population. The corresponding total for 1998 was 2250, giving a drug-related death rate of 4.27/100,000. The annual mortality rate of all addicts is not known. However, a recent study of addicts notified from across the UK to the Home Office shows a decline between 1967-76 and 1984-93 in the annual age-standardised rates from 19.0/1,000 person years to 10.5/1,000 person years (Ghodse *et al* 1998). Generally excess mortality declined over the period from about 13 to 7 for males and from 16 to 10 for females.

(C) DRDs in Scotland

In Scotland all sudden or suspicious deaths must be referred to a procurator fiscal who asks a pathologist to establish cause of death. Occasionally Fatal Accident Inquiries are held but this is not typically done for drug-related cases. Since 1994 forensic pathologists conducting postmortems have completed questionnaires on deaths involving drugs or persons known or suspected to be drug-dependent. In most cases toxicological tests for drugs are conducted. The fact that most postmortems are carried out in only 4 academic forensic departments means that there is a considerable degree of consistency in approach, unlike in England and Wales.

The procurator fiscal determines the cause of death based on information provided by the pathologist and police investigations. The information recorded on the death certificate (similar to that in England and Wales) is used in conjunction with the questionnaire completed by the pathologist by The General Register Office (Scotland) GRO(S) to code cause of death. The use of this questionnaire has greatly enhanced the accuracy of these statistics (Arrundale and Cole 1995).

GRO(S) does not include ICD-9 code 305 when compiling drug-related death statistics. Suicides are also excluded from these figures. Apart from these differences the same ICD-9 codes are used. However, they do make for an interesting comparison with the ONS definition given in Figure 15.1 (see Table

15.14). There are substantial increases in the numbers of additional cases recorded.

According to the GRO(S) definition, there were 263 drug-related deaths in 1997. This compares to 276 in 1998 and 340 in 1999 (Jackson and Cole 1998 and 1999), a rate of 5.13 per 100,000 population; if the ONS definition is used a rate of 8.72 per 100,000 is obtained for 1997. In addition, in 1997 there were 5 VSA deaths (rising to 10 in 1998) and 28 of persons with HIV/AIDS acquired through IDU (51.2% of all HIV/AIDS deaths in 1997).

Table 15.14. Deaths where selected controlled drugs were mentioned on death certificates, Scotland, 1997-1999 (*Sources*: GRO(S) and ONS)

Drug type	1997	1997	1998	1999
	ONS definition	GRO(S) definition		
All drug-related deaths	447	263	276	340
Methadone	91	79	64	62
Heroin	33	32	N/A	N/A
Morphine	54	48	N/A	N/A
Heroin/Morphine	N/A	80	114	163
Other opiate	7	N/A	N/A	N/A
Temazepam	34	25	46	52
Diazepam	95	69	105	135
Nitrazepam	2	N/A	N/A	N/A
Cocaine	5	4	4	11
Ecstasy	2	2	3	7
Other amphetamine	7	N/A	N/A	N/A
Barbiturate	4	N/A	N/A	N/A
Cannabis	8	N/A	N/A	N/A

Notes: Figures should not be added together to derive totals. N/A = not available

Statistics, based on the date of registration, are published in the *Annual Report of the Registrar General for Scotland,* as well as in special reports by the Vital Events Branch. These show that the number of deaths of known or suspected drug addicts rose from 142 to 179 in 1998, whereas the number of deaths of persons not known or suspected to be drug addicts fell from 121 to 97. The number of drug-related deaths increased by 23% in 1999 to 340. The number of known or suspected drug addicts who died was 227. Unlike

the previous year, the number of persons not known to be addicts rose to 113. This is believed to be a significant real change (Jackson and Cole 2000).
The drug-related mortality rate for Scotland, using the GRO(S) definition, rose from 5.13 per 100,000 population in 1997 to 5.39 in 1998, reaching 6.64 in 1999 - almost triple that of Northern Ireland and 50% higher than that of England and Wales. Of the 340 deaths recorded in 1999, 112 occurred in the Greater Glasgow Health Board area (the figure for 2000 is widely expected to be considerably higher). Here the number of deaths of those known or suspected to be drug-dependent rose from 77 to 90. 26 of the 42 deaths in the Grampian area were also of drug-dependent persons (up from 14 the previous year). The Lothian area, which includes Edinburgh, experienced 38 deaths in 1999. The majority of deaths in 1999 were of persons aged under 45, as in previous years. Of these, 65% were aged 25 to 44 and 27% under 25. Six of the 27 cases aged under 45 were known or suspected to be drug-dependent.

Heroin/morphine was involved in 48% of deaths in 1999; diazepam in 40%, and methadone in 18%. It is worth noting that diazepam was mentioned in 84 of the 163 deaths involving heroin/morphine. There are marked geographical differences in the involvement of some drugs implicated in deaths. Half of the 38 deaths in Lothian involved methadone, compared to one-sixth of the 112 deaths in Greater Glasgow. By contrast, heroin/morphine was mentioned in 69 of the Greater Glasgow deaths, but in only 7 of the Lothian deaths. Diazepam was involved in many deaths across Scotland, but temazepam featured mainly in Greater Glasgow. The presence of alcohol was noted in 96 of the 340 deaths, often with a relatively low blood-alcohol level.

As in England and Wales, opiates and benzodiazepines were the drug-types most often mentioned on death certificates in recent years. Whilst the involvement of heroin/morphine doubled between 1997 and 1999, the numbers of deaths involving methadone have fallen since 1997. This probably reflects a tightening up of the way in which methadone is dispensed by pharmacists in the Greater Glasgow area. What is more noticeable, however, is the higher rate of benzodiazepine use in Scotland especially diazepam, and temazepam despite much more restricted prescribing of jelly-filled capsules. There is also evidence of increasing numbers of deaths involving cocaine.

(D) DRDs in Northern Ireland

There is no substantive difference in the coroner's system operating in Northern Ireland from its counterpart in England and Wales. No deaths are coded by GRO (NI) to ICD-9 code 304 since death certificates in the province tend not to have mentions of 'addiction' or 'dependence'. As in Scotland all deaths coded to ICD-9 305 are due to alcohol. Statistics, based on date of registration, are published in *the Annual Report of the Registrar General for Northern Ireland*.

Table 15.15 presents details of deaths where selected controlled drugs were mentioned on death certificates in 1997, using the ONS definition. Although the numbers are small, there would appear to be a disproportionate problem with benzodiazepines – as in Scotland. This information was derived from an examination of death certificates since GRO(NI) does not have a dedicated drug-related deaths database. Such an innovation would be of great assistance in tracking developments in the province.

Table 15.15. Deaths where selected controlled drugs were mentioned on death certificates, Northern Ireland 1997[1] (*Sources*: GRO (NI) and ONS)

Drug type	Number
Methadone	2
Morphine	1
Temazepam	3
Diazepam	5
Ecstasy	3
Barbiturate	1

1: Figures should not be added together to derive totals. N/A = not available

In 1996 there were 48 opiate and cocaine addicts notified to the Home Office from Northern Ireland, a rate of only 22 per million population (Corkery 1997). Using the same approach outlined earlier, this would suggest a figure of 250 such addicts in the province, which traditionally has not had as much of a drug problem as other parts of the UK. According to the ONS definition, there were 39 drug-related deaths in 1997, a rate of 2.32 per 100.000 population. In addition there were 3 VSA deaths (as was also the case in 1998) and 1 person with HIV/AIDS acquired through IDU died.

Discussion

(A) National Programme on Substance Abuse Deaths

The other main UK source of statistics on drug-related deaths is the National Programme on Substance Abuse Deaths (NPSAD), run by the Centre for Addiction Studies at St George's Hospital Medical School in London. The Drug-related Deaths Database was established in conjunction with the Home Office following the closure of the Home Office Addicts Index in April 1997 (see Chapter 2). The purpose of the database is to provide information for the management of a national surveillance system for the monitoring of drug-related deaths reported by coroners. To date, 123 out of 135 coroners' jurisdictions in England and Wales have voluntarily reported to the Database; in the latest twelve-month period 113 jurisdictions reported. It is hoped that

coroners in Northern Ireland, and procurators fiscal in Scotland, will participate in this scheme in due course. in this way it can become a truly nation-wide database which can help inform policy-makers and other interested parties.

The range of information collected by the Database is wider than that generated by the death registration system or coroner's inquisitions on their own. Data collected includes:

(a) Demographic information such as name, address, place and date of birth, gender, ethnicity, occupational status, and living arrangements;
(b) Circumstances of birth such as date and place of death, prescribed medication, addiction status, and drugs present at post-mortem;
(c) Causes of death (coded to ICD-10), coroner's verdict, location where accidental deaths occurred; and
(d) Place and date of inquest.

Key findings that have consistently emerged from the series of reports produced by NPSAD include the following.

- About three-quarters of cases are male and under 45 years of age

- The majority of cases died from accidental poisonings. Males are more likely than females to die from accidental poisoning, whereas the reverse is true for intentional self-poisoning.

- About two-thirds of cases had a history of illicit drug use, and on average death was about 16 or 17 years earlier than for those without such a history

- Where specific drugs were identified, opioids (either alone or in combination with other drugs) were present at death in two-thirds of cases. On their own, opioids accounted for a third of deaths.

- Deaths involving methadone were more likely to be the result of illicit rather than prescribed drugs

- Dextropropoxyphene accounted for three-fifths of deaths involving opioid/opiate analgesics

- Antidepressants were implicated in about 1 in 6 cases, mostly where the drug was prescribed for the deceased

The second and third reports from the Programme cover the periods January-June (80 jurisdictions) and July-December (96 jurisdictions) of 1998 respectively (Ghodse *et al* 1999a and 1999b). These presented information on 1186 deaths for which inquests were held in this period. The fourth and fifth volumes present information on some 1413 inquests held during 1999 and a further 480 now received for 1997 and 1998 (Ghodse *et al* 2000a and 2000b). This database now has information on more than 5000 drug-related

deaths and is a reasonable resource on which research can be conducted. It could form the basis of a properly funded UK specialist registry for drug-related deaths. At present it can be used as a crosscheck for data collected for England and Wales by ONS.

The additional information collected by this programme, albeit somewhat limited, is of the type which would help provide a fuller understanding of the factors involved in drug-related deaths. It may well be that a national database is needed to collect information from a range of sources on deaths involving drugs. It would need to be properly funded and staffed, and given appropriate authority to gather such data, rather than relying on good will. In response to a question by a Member of Parliament in the House of Commons on 5 May 2000, the Minister of State at the Home Office, Charles Clarke, said:

"The Government is currently reviewing data collection requirements in relation to drug-related deaths and it would be premature to a make a decision on the funding of the database maintained by the National Programme on Substance Abuse Deaths while this review is ongoing."

(B) ACMD Report

The Prevention Working Group (PWG) of the Advisory Council on the Misuse of Drugs spent the period between Autumn 1997 and Spring 2000 examining the issue of how to reduce drug-related deaths. The Group examined the whole area of what sort of information is needed to monitor drug-related deaths and to inform policy. Their consideration encompassed the accuracy and quality of existing statistics, how they are collected, by whom, and for what purposes. Unfortunately, amongst the outcomes there were no suggested definitions of what might constitute a drug-related death. Suggestions on how such deaths can be reduced were presented in the Group's report.

The Group 'conclude that the current system for collecting and reporting on drug-related deaths in the UK stands in need of considerable amendment and strengthening. There is valuable experience on which to build, but the fact remains that at present the system for generating data on drug-related deaths in Britain cannot provide information of the quality needed' (ACMD 2000). They go on to identify point by point what they see as needing to be done, including:

1. The establishment of a national (UK) reporting and surveillance system for HBV and HCV (hepatitis B and C), together with the carrying out of repeat national sample surveys on the virus status of clients attending drug treatment agencies.
2. Toxicological screening to be ordered by coroners in England and Wales where there is reason to believe controlled drugs are involved in a death.
3. Better recording by coroners, and their Scottish counterparts, of the role of drugs in deaths.

4. A short life technical working group should be brought together to reach agreement on a consistent ICD coding framework to be used in future across all constituent countries of the UK.
5. Further support on international comparisons of drug-related mortality rates.
6. Necessary consultations to help set up (a) new overall system(s) for the collection of high quality data on drug-related deaths should be quickly got under way, with the needed resources to support the establishment of the system(s) then duly found.

(C) Technical Group to review drug-related death statistics

The UKADCU asked the Department of Health (DH) to convene a technical group comprised of experts in the relevant fields to consider how best the recommendations of the PWG could be taken forward. DH convened a meeting on 30 March 2000, to which were invited representatives of that Department, Home Office, ONS, GRO(S) and Scottish Executive, GRO(NI) and Department of Health and Social Security (Northern Ireland), UKADCU, NPSAD, the Centre for Research on Drugs and Health Behaviour at Imperial College, as well as the UK focal point for the EMCDDA. It was thought at a later stage to be appropriate to invite the participation of a toxicologist and representative of the Coroners' Society.

The meeting was held to address a number of initiatives. The UK Drug Strategy requires a baseline from 2000/2001 data for one of its targets - of reducing drug-related deaths. Several recommendations of the ACMD report are concerned with data gathering and analysis; DH has a target under the Drugs Strategy to implement, as appropriate, these recommendations. There is also work going on at an international level to establish appropriate indicators for drug-related deaths. This is particularly so with regard to EMCDDA data gathering needs.

In addition, a broad-based review is currently under way of the work of coroners, another is looking particularly at death certification to see if improvements can be made to the system. The latter will feed into the former. A Public Inquiry was announced on 22 September 2000 by the Secretary of State for Health, Alan Milburn, into the issues surrounding the crimes committed by Dr Harold Shipman, a General Practitioner who was found guilty of the murder of 15 of his patients (possibly up to 450) through the administration of drugs. These Inquiries may impact on the quality of and way in which data on drug-related deaths are collected.

A number of further meetings of the Technical Working Group have now taken place and considerable progress has been made, including the drawing up of a definition for drug-related deaths. The Group aims to publish a response to the ACMD Report, followed by suggestions for what should constitute a baseline figure for the Government's Drug Strategy, and to have developed an appropriate action plan by Summer 2001.

Conclusion

Both official mortality registers and special registers such as the NPSAD database have problems with their coverage of all drug-related deaths. They appear be equipped to provide basic statistics on deaths that are acute or directly associated with drugs. More information is available to the NPSAD database on factors impacting on such deaths. However, there is a need to collect a wider range of data on a broader continuum of drug-related mortality. It is only in this way that the true nature and extent of the problem in the UK will be understood. At the same time, such measures put in place should be capable of producing data similar to that currently used, so that there is continuity in the statistics. The need for a special register with a UK-wide responsibility undoubtedly exists. It needs to be set up as soon as possible, properly staffed and financially resourced, with appropriate statutory authority if needed.

Clearly, some ideological issues have to be squarely faced about who should be responsible for collecting and analysing such data, and ultimately disseminating the results to policy makers and others. Government departments may have to relinquish some of their secretiveness and work with other centres with specialist skills. At the same time medical researchers will have to acknowledge the key role that official data can play in acting as a benchmark against which their data can be measured. All those with an interest in reducing drug-related deaths, whatever we may mean by that term, need to come together for the common good. The challenge set by the ACMD report needs to be picked up swiftly and taken on with enthusiasm and objectivity.

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Part III

Drug-related mortality

Chapter 16 An overview of perspectives across Europe

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Introduction

The chapters in this volume have presented different perspectives of drug-related mortality in eleven member states of the European Union as well as Lithuania, Malta and Switzerland.

These contributions have provided a rich resource for understanding both qualitative and quantitative dimensions of drug-related deaths. This chapter provides an overview of pertinent issues that emerged from individual chapters, describing the commonalities and variations in the conceptualisation of drug-related mortality in the countries in this volume.

Problems of definition

There seems to be no standard definition of the term 'drug-related death' (DRD) across Europe. Some countries e.g. Greece, Italy and Netherlands, seem to adopt a definition that is somewhat identical to that termed by DAWN (US DHHS 2000) as 'drug-induced' death. This definition is limited to drug overdose deaths. The implication of such a restrictive definition is that DRDs are under-reported, having excluded deaths resulting from suicide and other consequences of illicit drug use, e.g. HIV, hepatitis etc. Given this lack of uniformity in definition, the efforts of the EMCDDA, the WHO and other international organisations to monitor DRDs are largely compromised. The inconsistency in definition also applies to different regions of a country e.g. UK, where DRD standards in England and Wales are different to both that adopted in Scotland, and different again to that in Northern Ireland.

Closely linked to the problem of definition are the presence or absence of general and specialist mortality registers and the authority responsible for administering these registers. There is no uniform framework for administering DRD data in the countries represented. The information provided by the contributors has allowed the classification of countries based on the presence and type of mortality registers. There are countries with no formal mortality register. These include Greece and Switzerland. Other countries have one form of system that can be broadly defined as a General Mortality Register (GMR). The UK, Sweden and the Netherlands operate specialist registers (SR) alongside GMRs. Cognisant of this inconsistency in EU Member States' level of administration of mortality registers, the EMCDDA drew up a standard for reporting results form both GMRs and SRs. With the lack of a framework for such reporting in some countries, it would seem that the EMCDDA's efforts would remain fruitless. However, a field trial conducted by them in 1999 found that 8 out of 15 countries could meet the requirements

for their DRD Standard for GMR, the remainder were close to it. Compliance by SRs was more limited.

Responsible authority

The development of a standard framework for reporting DRD statistics in Europe would require corresponding uniformity in the responsible authority in each country.

In countries such as France, Germany and Belgium, two or more agencies are responsible for compiling DRD statistics. In France, these agencies include the Police, Gendarmerie and Customs, Health and Medical Research Institute and the unions. In Germany, this responsibility is shared by the Police and the Public Health Services. In Belgium, the responsibility has been decentralised by the Ministry of Economic Affairs and is now shared by the authorities of each of the three Belgian Communities, in addition to a parallel system administered by the Justice Department.

Although all the countries represented in this volume adhere to the use of ICD codes for death classification, the variation in the definition of DRDs and in the responsible authorities undermines the accuracy of these codes. Furthermore, the taxonomic framework of ICD codes does not distinguish between illicit and prescribed drugs, a point underscored by Fugelstad in Chapter 13.

Death certification

The inaccuracies in death certificate completion by medical doctors have been well described. In Chapter 3, Reggers and his colleagues, highlighted the lack of training education and for general practitioners and emergency doctors in Belgium in completing death certificates. Consequently the certifying doctors provide insufficient information on the underlying cause of death. Given that this observation is not pertinent only to Belgium, there are sufficient reasons to uphold the fact that insufficient information on death certificates results in under-reporting of DRDs. This is a position held by many of the authors in this volume.

Toxicology

There are concerns across Europe that there are no uniform requirements for conducting toxicological analysis when an inquest in being undertaken by coroners. Where toxicological screening is conducted, the protocols applied vary across coroner's jurisdiction within the same country, e.g. the United Kingdom. Denmark appears to be an exception in that all the three forensic departments use the same guidelines and protocols for toxicological analysis.

Qualification of DRDs

In spite of the limitations of the DRD data gathering process, all the countries represented publish DRD statistics in one form or another, and through various outlets - government departments, the police, academic institutions, and even the media, as is the case in Greece.

In general, DRD statistics are found mainly on heroin-related fatalities. An exception to this pattern was observed in Lithuania where the majority of DRDs are attributable to sedative hypnotics. The danger of restricting DRD monitoring to heroin and other opiates is that fatalities attributed to other illicit drugs, especially emerging dangerous drugs, go largely unnoticed. In the UK, the National Programme on Substance Abuse Death (npSAD) maintains a surveillance system that is able to identify emerging DRD patterns. The npSAD has revealed increase in dextropropoxyphene deaths in the general population and among addicts, as well as the occurrence of GHB (gammahydroxybutyrate) - related fatality (Ghodse *et al* 2000). Fugelstad (Sweden) and Blank and colleagues (Germany) have demonstrated the value of cohort studies in quantifying DRDs. Schifano (UK) has reviewed numerous studies in Spain that demonstrated reduction in premature mortality among addicts over a prolonged period. Such studies, however, are more easily conducted where the population of interest, e.g. addicts in treatment or persons diagnosed with HIV/AIDS, is clearly specified.

Most of the contributors expressed concerns about lack of valid denominators in calculating annual DRD rates. As a result, the use of proportionate mortality statistics, that are less robust than mortality rates, have been maximised. It is, therefore, difficult to make transnational comparisons of DRD patterns.

Treatment Provision

Altogether, there is a consensus that DRD statistics are sensitive to the impact of treatment provision. In France, Guionnet and Wieviorka reported a significant decline in DRDs following the introduction of substitution therapy (methadone and buprenorphine). Similar observations were reported in Switzerland, following the introduction of heroin and methadone prescribing and in Germany following the provision of "injection rooms".

The establishment and expansion of substitution therapy programmes can also promote illicit diversion of prescribed drugs that are often implicated in DRDs. For instance, in the UK, methadone-related death is more likely to occur in those who obtain this drug from illicit sources (Ghodse *et al* 2000).

Conclusion

The problems and prospects of collecting reliable valued and accurate DRD statistics have been discussed by a group of subject-matter experts from fourteen European countries. There is a general consensus among these experts that close collaboration and co-operation among different agencies is essential. There are expectations that a uniform standard for providing DRD statistics will be possible. The authors' contribution to this volume demonstrates their conviction and commitment to making the development of a European standard for studying drug-related mortality a reality.

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Appendix

EMCDDA DRD-Standard Version 2.0

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State of affairs on 18-04-2001

Draft version

The DRD-Standard, Version 2.0

EMCDDA standard guidelines to report statistics on Drug-Related Deaths from the EU Member States

Part IA: ICD-09 coded General Mortality Registers
Part IB: ICD-10 coded General Mortality Registers
Part II: Special Registers

EMCDDA project CT.00.RTX.22

EMCDDA/EPI/2001

1. Replacement of previous versions

This version 2.0 of the DRD-Standard replaces the previous version 1.0. Version 1.0 was tested during a field trial in the summer of 1999 in the Member States of the European Union. The modifications of version 2.0 compared to its predecessor version 1.0 are reviewed in paragraph 6 below.

This version 2.0 of the DRD-Standard also replaces the third draft version of the spreadsheet GMR_02 for ICD-10 coded General Mortality Registers from 17-05-2000.

2. The origin of the DRD-Standard

The DRD-Standard is the Drug-Related Deaths Standard. It is the standard protocol for extracting data on drug-related deaths from registers in the Member States of the European Union.

The DRD-Standard has the following parts:

- Part I standardises extracting data from the General Mortality Registers (GMRs).
  - Part IA applies to ICD-9 coded GMRs.
  - Part IB applies to ICD-10 coded GMRs.
- Part II standardises extracting data from the Special Registers (SRs).

3. The rationale behind the DRD-Standard

There are two main sources of information on drug-related deaths: I. General Mortality Registers (GMRs), which are present in all countries of the European Union, and II. Special Registers held by the police or forensic institutions, which are present in a subset of countries. Both registers have advantages and disadvantages. For comparative purposes, data are collected from both types of registers.

4. General Mortality Registers

The standard comprises a series of *underlying causes of deaths* as coded under the International Classification of Diseases, 9th and 10th edition. These codes are specified at three- or four-digit level. Broad categories include: drugs psychosis, drug dependence, nondependent drug abuse, accidental poisoning, suicide and self-inflicted poisoning, and poisoning with intent undetermined.

The substances causing death need to be specified. For ICD-9 coded GMRs this requires that a number of defined E-codes (poisoning deaths) must be extracted in combination with *nature of injury* codes (N-codes). For ICD-10 coded GMRs this respectively requires that X-codes and Y-codes be extracted in combination with T-codes.

As one E-code may have multiple N-codes, a specific procedure must be followed to exclude double counting of persons.

Contributing causes of death are not included because a significant number of countries are not able to provide the corresponding data. There are also difficulties related to the interpretation of the data.

The defined standard for *data extraction and collection* does not automatically imply that all causes of death will be used for calculating the overall number of drug-related deaths in the EU Member States. A consensus has been reached among EU experts to include in the overall number the following categories: deaths by drugs psychoses, drug dependence, nondependent drug abuse, accidental poisoning, suicide and self-inflicted poisoning, and poisoning with undetermined intent. Only deaths due to drugs typical of abuse like opiates, cocaine, amphetamines, cannabis, and hallucinogens will be included. Psychoactive medicines will be excluded from the calculation of the overall number of drug-related deaths. Causes of death related to unspecified drugs are only collected to obtain insight into the accuracy of coding.

The standard also specifies the breakdown by *gender* and *age groups.*

5. Special Registers

Information on fatal drug poisoning is common to most Special Registers. Therefore, part II of the DRD-Standard focuses on poisoning cases. In accordance with prevailing international classifications, 'poisoning' means an unnatural, violent, external cause of death. It includes homicide by poisoning, suicide by poisoning, accidental poisoning, and poisoning with undetermined intent. In everyday language 'poisoning' is usually called 'overdose'.

It has appeared feasible to distinguish between poisoning cases in which different substances have played a role: opiates only (excluding methadone), methadone only, poly-substances including opiates, poly-substances excluding opiates, psychoactive medicines, and unspecified/unknown substances. Therefore, this distinction between substances has been chosen as the breakdown for the poisoning cases together with the standard breakdown by gender and age group.

The Special Registers in some countries are also able to distinguish other causes of death than poisoning. These other causes differ widely between the countries. Therefore, within the DRD-Standard, the other causes than poisoning are grouped together into natural/internal causes like diseases, accidents other than by poisoning, suicide other than by poisoning, homicide other than by poisoning, and undetermined external causes other than poisoning. The Special Registers are asked to specify which cases are grouped together into these other causes. These other causes are also broken down by gender and the standard age breakdown.

6. Modifications compared to the previous version 1.0

Compared to the previous version 1.0 of the DRD-Standard, this version 2.0 is modified as follows:

- For ICD-9 coded GMRs (see Table 1 below), for the DRD-numbers 23, 24, 35, 36, 44, 45, 53, and 54, the code "N969.9" has been replaced by "N969.6".
- For those ICD-9 coded GMRs that can only combine E-codes with one N-code (instead of two), it has been standardised how to make these combinations (see Table 2).
- For ICD-10 coded GMRs the DRD-numbers 56 through 151 have been added (see Table 3 below). Herewith version 2.0 of the DRD-Standard replaces the third draft version of the spreadsheet GMR_02 for ICD-10 coded General Mortality Registers from 17-05-2000. Please notice that compared to this previous draft version the numbering of DRD56 through DRD151 has been changed.
- For the SRs (see Table 4 below), the breakdown into overdoses has been changed into poisoning by opiates only (excluding methadone), methadone only, poly-substances including opiates, poly-substances excluding opiates, psychoactive medicines, and unspecified/unknown substances. The breakdown into other causes than poisoning has been changed into natural/internal, accidents other than by poisoning, suicide other than by poisoning, homicide other than by poisoning, and undetermined other than poisoning.
- For the GMRs as well as the SRs the previous 5 age groups have been replaced by 13 age groups. The 13 new age groups are (1) 0-14 years, (2) 15-19 years, (3) 20-24 years, (4) 25-29 years, (5) 30-34 years, (6) 35-39 years, (7) 40-44 years, (8) 45-49 years, (9) 50-54 years, (10) 55-59 years, (11) 60-64 years, (12) 65 years or older, and (13) age group unknown.

7. Limitations of the DRD-standard

The current standard for General Mortality Registers focuses on underlying causes of death and does not take into account deaths where drug use is a contributory cause of death. The last category of deaths comprises natural causes of death (such as cardiac diseases) as well as external causes of death other than poisoning (such as accidents) where drugs are indirectly involved. Depending on the width of the definition adopted for drug-related deaths this standard may give rise to underreporting. In a similar vein, underreporting may occur under the standard for Special Registers because of its focus on harmonising direct deaths (poisoning) in contrast to deaths indirectly related to drug use.

8. General guidelines to apply the DRD-Standard

The DRD-Standard is the European Union's greatest common divisor to extract data on drug-related deaths. This implies that some Member States will not be able to confirm exactly to the DRD-Standard. In all cases in which the DRD-Standard cannot be applied exactly, please act as follows:

- Please deviate from the DRD-Standard in such a way that the resulting data will approach the standard as much as possible. (In case ICD-9 E-codes can only be combined with one N-code, instead of two, see Table 2).
- While sending in the aggregated data by means of the spreadsheets, please report all deviations from the DRD-Standard in a separate technical report.

9. The form of the DRD-Standard

The DRD-Standard is given by the Excel-spreadsheets in which the aggregated data on drug-related deaths are to be reported.

For the ICD-9 coded General Mortality Registers, the format of the spreadsheet is shown in
Table 1. For the ICD-10 coded General Mortality Registers, the format of the spreadsheet is shown in Table 3.

For the Special Registers, the format of the spreadsheet is shown in Table 4.

Retrieving the aggregated numbers that must be reported in the cells of the spreadsheet, may require the development of special computer programs that will select and count the appropriate cases. These new computer programs

will differ between the countries, because they must fit to the specific data structure of a General Mortality Register in a given country. Therefore, the DRD-Standard for all Member States is stated in general terms.

10. Logical terminology

Beware of the fact that the DRD-Standard applies formal logical terminology, because logical terminology can be translated directly into computer languages. This counts especially for selections of cases that are defined by the terms 'AND' and 'OR'. Beware of the fact that in common language the words 'and' and 'or' have a different meaning compared to the logical meaning of 'AND' and 'OR'. Especially for the General Mortality Registers, it is recommended that professionals, who are trained to apply formal logic, extract the data on drug-related deaths.

The logical definition of 'AND'

In logical terminology, the prescription ’A AND B’ means that a case is only selected if the case satisfies condition A *as well as* condition B. If the case does not satisfy condition A, the case is not selected. If the case does not satisfy condition B, it is selected neither. Of course, the case is also not selected if it does not satisfy condition A and does not satisfy condition B as well.

The logical definition of 'OR'

In logical terminology, the prescription ’A OR B’ means that a case is selected if condition A is satisfied, if condition B is satisfied, or if both conditions A and B are satisfied. The case is not selected if both conditions A and B are not satisfied.

The mutual definitions of 'AND' and 'OR'

From the logical definitions of 'AND' and 'OR' given above, it follows that (A AND B) equals NOT (NOT A OR NOT B). Conversely, (A OR B) equals NOT (NOT A AND NOT B). This way, 'AND' and 'OR' are mutually defined by one another.

The definition of 'through'

For the DRD-Standard the term 'through' means 'up to and including'. For example '1 through 10' means: '1, 2, 3, 4, 5, 6, 7, 8, 9, and 10'. Furthermore, ‘1-10’ means ‘1 through 10’, which equals ‘1 up to and including 10’ as defined above.

Part IA: The protocol for ICD-9 coded General Mortality Registers

For ICD-9, the DRD-Standard focuses on the following categories of underlying causes of death:

Underlying cause of death	Selected ICD-9 code(s)
Drug psychoses	292
Drug dependence	304.0, 304.2-9
Nondependent drug abuse	305.2-3, 305.5-7, 305.9
Accidental drug poisoning	E850.0, E850.8[1)], E854.1-2, E855.2, and E858.8[1)]
Suicide and self-inflicted drug poisoning	E950.0[1)], E950.4[1)]
Drug poisoning undetermined intent	E980.0[1)], E980.4[1)]

[1)] In combination with N-codes (N965.0, and/or N968.5, and/or N969.6, and/or N969.7), as explained below.

The protocol for extracting data on drug-related deaths from ICD-9 coded General Mortality Registers consists in taking three consecutive steps:

Step 1: Apply the spreadsheets for ICD-9 coded General Mortality Registers

For ICD-9 coded GMRs, the format of the spreadsheet to report the aggregated data is given in Table 1 below. For each combination of registration year and gender, a spreadsheet can be filled in.

For each spreadsheet, 55 different selections of causes of drug-related deaths are to be made from the General Mortality Register. These 55 selections are labelled DRD1 through DRD55. DRD1 through DRD55 are described in the explanations following Table 1.

The cases that are selected are counted within 13 age groups. The 13 age groups are (1) 0-14 years, (2) 15-19 years, (3) 20-24 years, (4) 25-29 years, (5) 30-34 years, (6) 35-39 years, (7) 40-44 years, (8) 45-49 years, (9) 50-54 years, (10) 55-59 years, (11) 60-64 years, (12) 65 years or older, and (13) age group unknown. For each combination of DRD1 through DRD55 and age group, the respective numbers of selected cases are to be reported in the respective cells of the spreadsheet.

Step 2: Select the single ICD-9 codes

Some DRD-codes are defined by just one ICD-9 code. Other DRD-codes are defined by combinations of ICD-9 codes. If a DRD-code is defined by only one ICD-9 code, only select a case if the *underlying* cause of death is coded to the respective ICD-9 code. This means that in case of one ICD-9 code, *contributing* causes of death are *not* taken into account and are *not* selected. The DRD-codes that are defined by only one ICD-9 code are: DRD1 through DRD20, DRD25 through DRD32, DRD37, DRD39, DRD40, DRD46, DRD48, DRD49, and DRD55. Step 3 below prescribes how to select DRD-codes that are defined by combinations of E- and N-codes.

Step 3: Select the combinations of ICD-9 codes

It is preferred that E-codes can be combined with at least two N-codes. In case only one N-code is available, see below at alternative 2 for step 3.

The DRD-codes that are defined by combinations of E- and N-codes are: DRD21 through DRD24, DRD33 through DRD36, DRD38, DRD41 through DRD45, DRD47, and DRD50 through DRD54. The selection criterion for these DRD-codes always starts with an E-code. These are E850.8, E858.8, E950.0, E950.3, E950.4, E980.0, E980.3, and E980.4. These E-codes refer to the underlying cause of death. Of these, codes E950.0 and E980.0 must be extracted in combination with N-code 965.0 to obtain cases related to opiates. Similarly, codes E950.3 and E980.3 must be extracted in combination with N-code 969.4 to extract cases related to benzodiazepines.

The remaining four codes (E850.8, E858.8, E950.4, E980.4) are known to be associated with multiple N-codes, at least in some countries. In order to avoid double counting, cases should be assigned into one of four mutually exclusive categories. At a descriptive level these categories are:

opiates AND cocaine (regardless of other substances);
opiates AND NO cocaine (regardless of other substances);
mixed, including one or more of the following: cocaine OR stimulants OR hallucinogens AND NO opiates (regardless of other substances);
other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens.

The corresponding definitions can be found in Table 1 under DRD21-DRD24, DRD33-DRD36, DRD42-DRD45 and DRD51-DRD54.

Option to avoid laborious spreadsheet work

Filling in a sequence of spreadsheets, of which the format is shown in Table 1, may result in laborious work. Ultimately, the data from these spreadsheets will be transferred to a general SPSS database. Some programmers will be able to shortcut this roundabout route of the spreadsheets. Programming the output in the format of the ultimate general database has proven to be even less difficult than programming the output for filling in the spreadsheets.

Programmers who prefer a shortcut that will save much work for both parties, are requested to contact Guus Cruts directly at the e-mail address gcruts@trimbos.nl to obtain the codebook of the ultimate database. If output can be programmed directly according to this codebook, the spreadsheets can be skipped entirely.

Alternative 1 for step 3: N-codes by exception from contributing causes

In some countries, codes E850.8, E858.8, E950.4 or E980.4 may have one additional N-code that is non-specific, for example, code N977.8 (other drugs and medicaments) or N977.9 (unspecified drug or medicament). Information on the specific substances involved (e.g. opiates) may be contained in a series of N-codes recorded as contributing causes. In this specific situation, the N-codes recorded as *contributing* causes of death, and all other information pertaining to a case, must also be taken into account. For example, if the underlying cause of death is coded to E850.8 in combination with N965.0 and in combination with N968.5, the case counts as a DRD21. The case counts as a DRD21 if in *all* information about the case, including the contributing causes, E850.8 is found in combination somewhere with N965.0 AND somewhere with N968.5. The same logic applies to the other DRD-codes that are defined by combinations of E-codes and N-codes.

Table 1: Spreadsheet format for ICD-9 coded GMRs

		Age group*)													
DRD	**ICD9-Code(s)**	1	2	3	4	5	6	7	8	9	10	11	12	13	**T**
1	292														**0**
2	304.0														**0**
3	304.1														**0**
4	304.2														**0**
5	304.3														**0**
6	304.4														**0**
7	304.5														**0**
8	304.6														**0**
9	304.7														**0**
10	304.8														**0**
11	304.9														**0**
12	305.2														**0**
13	305.3														**0**
14	305.4														**0**
15	305.5														**0**
16	305.6														**0**
17	305.7														**0**
18	305.8														**0**
19	305.9														**0**
20	E850.0														**0**
21	E850.8 AND N965.0 AND N968.5														**0**
22	E850.8 AND N965.0 AND NOT N968.5														**0**
23	E850.8 AND (N968.5 OR N969.7 OR N969.6) AND NOT N965.0														**0**
24	E850.8 AND NOT N965.0 AND NOT (N968.5 OR N969.7 OR N969.6)														**0**
25	E850.9														**0**
26	E851														**0**
27	E852														**0**
28	E853.2														**0**
29	E854.1														**0**
30	E854.2														**0**
31	E855.2														**0**
32	E855.9														**0**
33	E858.8 AND N965.0 AND N968.5														**0**
34	E858.8 AND N965.0 AND NOT N968.5														**0**
35	E858.8 AND (N968.5 OR N969.7 OR N969.6) AND NOT N965.0														**0**
36	E858.8 AND NOT N965.0 AND NOT (N968.5 OR N969.7 OR N969.6)														**0**
37	E858.9														**0**
38	E950.0 AND N965.0														**0**
39	E950.1														**0**
40	E950.2														**0**
41	E950.3 AND N969.4														**0**
42	E950.4 AND N965.0 AND N968.5														**0**
43	E950.4 AND N965.0 AND NOT N968.5														**0**
44	E950.4 AND (N968.5 OR N969.7 OR N969.6) AND NOT N965.0														**0**
45	E950.4 AND NOT N965.0 AND NOT (N968.5 OR N969.7 OR N969.6)														**0**
46	E950.5														**0**
47	E980.0 AND N965.0														**0**
48	E980.1														**0**
49	E980.2														**0**
50	E980.3 AND N969.4														**0**
51	E980.4 AND N965.0 AND N968.5														**0**
52	E980.4 AND N965.0 AND NOT N968.5														**0**
53	E980.4 AND (N968.5 OR N969.7 OR N969.6) AND NOT N965.0														**0**
54	E980.4 AND NOT N965.0 AND NOT (N968.5 OR N969.7 OR N969.6)														**0**
55	E980.5														**0**
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

*)Age groups: 1 = <15, 2 = 15-19, 3 = 20-24, 4 = 25-29, 5 = 30-34, 6 = 35-39, 7 = 40-44, 8= 45-49, 9 = 50-54, 10 = 55-59, 11 = 60-64, 12 = >=65, 13 = age unknown.

Explanation to Table 1: DRD1 through DRD37

DRD	Explanation
1	Drug psychoses
2	Drug dependence, morphine type
3	Drug dependence, barbiturate type
4	Drug dependence, cocaine
5	Drug dependence, cannabis
6	Drug dependence, amphetamine type and other psychostimulants
7	Drug dependence, hallucinogens
8	Drug dependence, other
9	Drug dependence, combination of morphine-type drug with any other
10	Drug dependence, combination excluding morphine-type drug
11	Drug dependence, unspecified
12	Nondependent abuse of drugs, cannabis
13	Nondependent abuse of drugs, hallucinogens
14	Nondependent abuse of drugs, barbiturates and tranquillisers
15	Nondependent abuse of drugs, morphine type
16	Nondependent abuse of drugs, cocaine type
17	Nondependent abuse of drugs, amphetamine type
18	Nondependent abuse of drugs, antidepressants
19	Nondependent abuse of drugs, other, mixed, or unspecified
20	Accidental poisoning, opiates and related narcotics
21	Accidental poisoning, mixed including opiates AND cocaine
22	Accidental poisoning, mixed including opiates AND NO cocaine
23	Accidental poisoning, including cocaine OR stimulants OR hallucinogens and NO opiates
24	Accidental poisoning, other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens
25	Accidental poisoning, unspecified analgesics, antipyretics, antirheumatics
26	Accidental poisoning, barbiturates
27	Accidental poisoning, other sedatives and hypnotics
28	Accidental poisoning, benzodiazepines
29	Accidental poisoning, psychodysleptics (including cannabis and hallucinogens)
30	Accidental poisoning, psychostimulants (including amphetamines)
31	Accidental poisoning, local anaesthetics (including cocaine)
32	Accidental poisoning, unspecified other drugs acting on the nervous system
33	Accidental poisoning, mixed including opiates AND cocaine
34	Accidental poisoning, mixed including opiates AND NO cocaine
35	Accidental poisoning, including cocaine OR stimulants OR hallucinogens and NO opiates
36	Accidental poisoning, other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens
37	Accidental poisoning, unspecified other drugs

(continued)

Explanation to Table 1 *(continued)* : DRD38 through DRD55

38	Suicide and self-inflicted poisoning, opiates
39	Suicide and self-inflicted poisoning, barbiturates
40	Suicide and self-inflicted poisoning, other sedatives and hypnotics
41	Suicide and self-inflicted poisoning, benzodiazepines
42	Suicide and self-inflicted poisoning, mixed including opiates AND cocaine
43	Suicide and self-inflicted poisoning, mixed including opiates AND NO cocaine
44	Suicide and self-inflicted poisoning, including cocaine OR stimulants OR hallucinogens and NO opiates
45	Suicide and self-inflicted poisoning, other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens
46	Suicide and self-inflicted poisoning, other unspecified drugs or medicaments
47	Poisoning undetermined intent, opiates
48	Poisoning undetermined intent, barbiturates
49	Poisoning undetermined intent, other sedatives and hypnotics
50	Poisoning undetermined intent, benzodiazepines
51	Poisoning undetermined intent, mixed including opiates AND cocaine
52	Poisoning undetermined intent, mixed including opiates AND NO cocaine
53	Poisoning undetermined intent, including cocaine OR stimulants OR hallucinogens and NO opiates
54	Poisoning undetermined intent, other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens
55	Poisoning undetermined intent, other unspecified drugs or medicaments

Alternative 2 for step 3: Combinations with only one N-code

To apply the DRD-Standard, version 2.0 completely, it is required that ICD-9 E-codes can be combined with at least two ICD-9 N-codes. However, for the General Mortality Registers of some countries, E-codes can only be combined with one N-code. The following guidelines describe how to act if E-codes can only be combined with one N-code.

Please report during data delivery if this alternative for step 3 has been applied.

Table 2 below shows how to compute DRD1 through DRD55 in case E-codes can only be combined with one N-code.

Table 2: Combinations of E-codes with one N-code

DRD-number(s)	Computation prescription
DRD1 through DRD20	Compute as already prescribed in Table 1.
DRD21	E850.8 AND N965.0
DRD22	Do not compute but leave empty.
DRD23	E850.8 AND N968.5 E850.8 AND N969.7 E850.8 AND N969.6
DRD24 through DRD32	Compute as already prescribed in Table 1.
DRD33	E858.8 AND N965.0
DRD34	Do not compute but leave empty.
DRD35	E858.8 AND N968.5 E858.8 AND N969.7 E858.8 AND N969.6
DRD36 through DRD41	Compute as already prescribed in Table 1.
DRD42	E950.4 AND N965.0
DRD43	Do not compute but leave empty.
DRD44	E950.4 AND N968.5 E950.4 AND N969.7 E950.4 AND N969.6
DRD45 through DRD50	Compute as already prescribed in Table 1.
DRD51	E980.4 AND N965.0
DRD52	Do not compute but leave empty.
DRD53	E980.4 AND N968.5 E980.4 AND N969.7 E980.4 AND N969.6
DRD54 through DRD55	Compute as already prescribed in Table 1.

Explanation to Table 2

Table 2 above prescribes the following:

1. Compute DRD1 through DRD20 as prescribed by the DRD-Standard.

2. Compute DRD21 as “E850.8 AND N965.0”, meaning “accidental poisoning, mixed including opiates”.

3. Do not compute DRD22, because these cases are merged with DRD21.

4. Compute DRD23 as “E850.8 AND (N968.5 OR N969.7 OR N969.6)”, meaning “accidental poisoning, including cocaine OR stimulants OR hallucinogens”.

5. Compute DRD24 through DRD32 as prescribed by the DRD-Standard.

6. Compute DRD33 as “E858.8 AND N965.0”, meaning “accidental poisoning, mixed including opiates”.

7. Do not compute DRD34, because these cases are merged with DRD33.

8. Compute DRD35 as “E858.8 AND (N968.5 OR N969.7 OR N969.6)”, meaning “accidental poisoning, including cocaine OR stimulants OR hallucinogens”.

9. Compute DRD36 through DRD41 as prescribed by the DRD-Standard.

10. Compute DRD42 as “E950.4 AND N965.0”, meaning “suicide and self-inflicted poisoning, mixed including opiates”.

11. Do not compute DRD43, because these cases are merged with DRD42.

12. Compute DRD44 as “E950.4 AND (N968.5 OR N969.7 OR N969.6)”, meaning “suicide and self-inflicted poisoning, including cocaine OR stimulants OR hallucinogens”.

13. Compute DRD45 through DRD50 as prescribed by the DRD-Standard.

14. Compute DRD51 as “E980.4 AND N965.0”, meaning “poisoning undetermined intent, mixed including opiates”.

15. Do not compute DRD52, because these cases are merged with DRD51.

16. Compute DRD53 as “E980.4 AND (N968.5 OR N969.7 OR N969.6)”, meaning “poisoning undetermined intent, including cocaine OR stimulants OR hallucinogens”.

17. Compute DRD54 through DRD55 as prescribed by the DRD-Standard.

Consequences

Following the 17 guidelines above will have the following consequences for data delivery:

DRD21 merges with DRD22 into DRD21.

DRD33 merges with DRD34 into DRD33.

DRD42 merges with DRD43 into DRD42.

DRD51 merges with DRD52 into DRD51.

Part IB: The protocol for ICD-10 coded General Mortality Registers

For ICD-10, the DRD-Standard focuses on the following categories of underlying causes of death:

Underlying cause of death	Selected ICD-10 code(s)
Disorders	F11-F16, F18-F19
Accidental poisoning	X42[1)], X41[1)]
Intentional poisoning	X62[1)], X61[1)]
Poisoning undetermined intent	Y12[1)], Y11[1)]

[1)]In combination with T-codes, as explained below.

The protocol for extracting data on drug-related deaths from ICD-10 coded General Mortality Registers consists in taking three consecutive steps:

Step 1: Apply the spreadsheets for ICD-10 coded General Mortality Registers

For ICD-10 coded GMRs, the format of the spreadsheet to report the aggregated data is given in Table 3 below. For each combination of registration year and gender, a spreadsheet can be filled in.

For each spreadsheet, 96 different selections of causes of drug-related deaths are to be made from the General Mortality Register. These 96 selections are labelled DRD56 through DRD151. DRD56 through DRD151 are described in Table 3 itself.

The cases that are selected are counted within 13 age groups. The 13 age groups are (1) 0-14 years, (2) 15-19 years, (3) 20-24 years, (4) 25-29 years, (5) 30-34 years, (6) 35-39 years, (7) 40-44 years, (8) 45-49 years, (9) 50-54 years, (10) 55-59 years, (11) 60-64 years, (12) 65 years or older, and (13) age group unknown. For each combination of DRD56 through DRD151 and age group, the respective numbers of selected cases are to be reported in the respective cells of the spreadsheet.

Step 2: Select the single ICD-10 codes

Some DRD-codes are defined by just one ICD-10 code. Other DRD-codes are defined by combinations of ICD-10 codes. If a DRD-code is defined by only one ICD-10 code, only select a case if the *underlying* cause of death is coded to the respective ICD-10 code. This means that in case of one ICD-10

code, *contributing* causes of death are *not* taken into account and are *not* selected. The DRD-codes that are defined by only one ICD-10 code are: DRD56 through DRD87, DRD98 (for some countries), DRD118 (for some countries), DRD138 (for some countries), and DRD148 through DRD151. Step 3 below prescribes how to select DRD-codes that are defined by combinations of X- and Y-codes with T-codes.

Step 3: Select the combinations of ICD-10 codes

It is preferred that X- and Y-codes can be combined with at least one T-code that specifies the underlying cause of death. In case no T-code is available as a specification of the underlying cause of death, see below at alternative 2 for step 3.

The DRD-codes that are defined by combinations of X- and Y-codes with T-codes are: DRD88 through DRD97, DRD99 through DRD117, DRD119 through DRD137, and DRD139 through DRD147. The selection criterion for these DRD-codes always starts with an X- or Y-code. These are primarily X42, X41, X62, X61, Y12, and Y11. These X- and Y-codes refer to the underlying cause of death. At DRD88, for example, “X42 AND T40.0” represents accidental poisoning by opium.

Option to avoid laborious spreadsheet work

Filling in a sequence of spreadsheets, of which the format is shown in Table 3, may result in laborious work. Ultimately, the data from these spreadsheets will be transferred to a general SPSS database. Some programmers will be able to shortcut this roundabout route of the spreadsheets. Programming the output in the format of the ultimate general database has proven to be even less difficult than programming the output for filling in the spreadsheets.

Programmers who prefer a shortcut that will save much work for both parties, are requested to contact Guus Cruts directly at the e-mail address gcruts@trimbos.nl to obtain the codebook of the ultimate database. If output can be programmed directly according to this codebook, the spreadsheets can be skipped entirely.

Alternative 1 for step 3: T-codes by exception from contributing causes

In some countries, information on the specific substances involved (e.g. opiates) may be contained in a series of T-codes recorded as contributing

causes. In this specific situation, the T-codes recorded as *contributing* causes of death, and all other information pertaining to a case, must also be taken into account. For example, if the underlying cause of death is coded to X42 in combination with T40.0, the case counts as a DRD88. The case counts as a DRD88 if in *all* information about the case, including the contributing causes, X42 is found in combination somewhere with T40.0. The same logic applies to the other DRD-codes that are defined by combinations of X- and Y-codes with T-codes.

Alternative 2 for step 3: X- and Y-codes without T-codes

To apply the DRD-Standard, version 2.0 completely, it is required that ICD-10 X- and Y-codes can be combined with at least one ICD-10 T-code. However, for the General Mortality Registers of some countries, X- and Y-codes cannot be combined with any T-code. The following guidelines describe how to act if X- and Y-codes cannot be combined with any T-code. Please report during data delivery if this alternative for step 3 has been applied.

In case X-codes and Y-codes cannot be combined with any specifying T-code, please deviate from the prescriptions above as follows:

Do not compute DRD88 through DRD97, but only compute DRD98, that is X42.

Do not compute DRD99 through DRD105.

For DRD106, instead of "X44 AND T50.9", only compute X44.

For DRD107, instead of "X49 AND T50.9", only compute X49.

Do not compute DRD108 through DRD117, but only compute DRD118, that is X62.

Do not compute DRD119 through DRD125.

For DRD126, instead of "X64 AND T50.9", only compute X64.

For DRD127, instead of "X69 AND T50.9", only compute X69.

Do not compute DRD128 through DRD137, but only compute DRD138, that is Y12.

Do not compute DRD139 through DRD145.

For DRD146, instead of "Y14 AND T50.9", only compute Y14.

For DRD147, instead of "Y19 AND T50.9", only compute Y19.

Step 4: Make specific estimations

The GMRs of some countries code drug-related deaths to unspecified codes like X44, X49, X64, X69, Y14, and Y19, sometimes in combination with T50.9. These codes are represented by DRD106, DRD107, DRD126, DRD127, DRD146, and DRD147. The question is which percentage of cases in these categories can be attributed to drugs. Please answer this question by filling in the following table on the accompanying spreadsheet:

DRD	ICD10-Code(s)	(I) % of cases with opiates	(II) % of cases with drugs of abuse* but no opiates	If (I) and (II) cannot be differentiated: % of cases with drugs of abuse*
106	X44 AND T50.9**			
107	X49 AND T50.9**			
126	X64 AND T50.9**			
127	X69 AND T50.9**			
146	Y14 AND T50.9**			
147	Y19 AND T50.9**			

*drugs of abuse are: opiates, cocaine, amphetamines, hallucinogens, cannabis, and synthetic drugs

**If no T-codes are available, only apply the single X-code or the single Y-code.

The accompanying spreadsheet also asks on which source(s) the estimations for the table above are based.

Step 5: Answer specific questions

Question 1

A first question is how multiple substances are coded. How would your General Mortality Register code cases to ICD-10 where the underlying cause of death involves multiple substances? Please answer this question by filling in the following table on the accompanying spreadsheet:

Multiple substances	ICD-10 code(s)
opiates and alcohol	
opiates and no alcohol	
drug(s) of abuse*, no opiates, no alcohol	
drug(s) of abuse*, no opiates, alcohol	

*drugs of abuse are: opiates, cocaine, amphetamines, hallucinogens, cannabis, and synthetic drugs

Question 2

A second question is to what extent cases of "other synthetic narcotics", that is DRD92, DRD112, and DRD132, contain deaths due to the synthetic opiate *dextropropoxyphene*. Please answer this question by filling in the following table on the accompanying spreadsheet:

DRD	ICD-10 code(s)	Percentage of dextropropoxyphene cases
DRD92	X42 AND T40.4*	
DRD112	X62 AND T40.4*	
DRD132	Y12 AND T40.4*	

*If no T-codes are available, only apply the single X-code or the single Y-code.

Question 3

A third question is how unspecified overdoses are coded. If "overdose" is stated on the death certificate without further specifications, to what ICD-10 code(s) is such a case coded?

Table 3: Spreadsheet format for ICD-10 coded GMRs

	Underlying cause of death / Substances		Age group*)												
			1	2	3	4	5	6	7	8	9	10	11	12	13	
DRD	**Disorders: Acute intoxication**	**ICD10-Code(s)**														**T**
56	Opioids	F11.0														**0**
57	Cannabinoids	F12.0														**0**
58	Sedatives	F13.0														**0**
59	Cocaine	F14.0														**0**
60	Other stimulants	F15.0														**0**
61	Hallucinogens	F16.0														**0**
62	Volatile solvents	F18.0														**0**
63	Multiple/other	F19.0														**0**
DRD	**Disorders: Harmful use**	**ICD10-Code(s)**														**T**
64	Opioids	F11.1														**0**
65	Cannabinoids	F12.1														**0**
66	Sedatives	F13.1														**0**
67	Cocaine	F14.1														**0**
68	Other stimulants	F15.1														**0**
69	Hallucinogens	F16.1														**0**
70	Volatile solvents	F18.1														**0**
71	Multiple/other	F19.1														**0**
DRD	**Disorders: Dependence**	**ICD10-Code(s)**														**T**
72	Opioids	F11.2														**0**
73	Cannabinoids	F12.2														**0**
74	Sedatives	F13.2														**0**
75	Cocaine	F14.2														**0**
76	Other stimulants	F15.2														**0**
77	Hallucinogens	F16.2														**0**
78	Volatile solvents	F18.2														**0**
79	Multiple/other	F19.2														**0**
DRD	**Disorders: Other**	**ICD10-Code(s)**														**T**
80	Opioids	F11.3-9														**0**
81	Cannabinoids	F12.3-9														**0**
82	Sedatives	F13.3-9														**0**
83	Cocaine	F14.3-9														**0**
84	Other stimulants	F15.3-9														**0**
85	Hallucinogens	F16.3-9														**0**
86	Volatile solvents	F18.3-9														**0**
87	Multiple/other	F19.3-9														**0**
DRD	**Accidental poisoning**	**ICD10-Code(s)**														**T**
88	Opium	X42 AND T40.0														**0**
89	Heroin	X42 AND T40.1														**0**
90	Other opioids	X42 AND T40.2														**0**
91	Methadone	X42 AND T40.3														**0**
92	Other synthetic narcotics	X42 AND T40.4														**0**
93	Cocaine	X42 AND T40.5														**0**
94	Other and unspecified narcotics	X42 AND T40.6														**0**
95	Cannabis	X42 AND T40.7														**0**
96	Lysergide [LSD]	X42 AND T40.8														**0**
97	Other/unspec. psychodysleptics	X42 AND T40.9														**0**
98	Narcotics and psychodysleptics	X42*														**0**
99	Barbiturates	X41 AND T42.3														**0**
100	Benzodiazepines	X41 AND T42.4														**0**
101	Other antiepileptic and sedative	X41 AND T42.6														**0**
102	Antiepileptic and sedative unspec.	X41 AND T42.7														**0**
103	Psychostimulants	X41 AND T43.6														**0**
104	Other psychotropic	X4* AND T43.8														**0**
105	Psychotropic unspecified	X4* AND T43.9														**0**
106	Other and unspecified drugs	X44 AND T50.9														**0**
107	Other and unspecified chemicals	X49 AND T50.9														**0**

(continued)

Table 3 *(continued):* Spreadsheet format for ICD-10 coded GMRs

	Underlying cause of death		**Age group**[*)]													
	Substances		1	2	3	4	5	6	7	8	9	10	11	12	13	
DRD	**Intentional poisoning**	**ICD10-Code(s)**														**T**
108	Opium	X62 AND T40.0														**0**
109	Heroin	X62 AND T40.1														**0**
110	Other opioids	X62 AND T40.2														**0**
111	Methadone	X62 AND T40.3														**0**
112	Other synthetic narcotics	X62 AND T40.4														**0**
113	Cocaine	X62 AND T40.5														**0**
114	Other and unspecified narcotics	X62 AND T40.6														**0**
115	Cannabis	X62 AND T40.7														**0**
116	Lysergide [LSD]	X62 AND T40.8														**0**
117	Other/unspec. psychodysleptics	X62 AND T40.9														**0**
118	Narcotics and psychodysleptics	X62*														**0**
119	Barbiturates	X61 AND T42.3														**0**
120	Benzodiazepines	X61 AND T42.4														**0**
121	Other antiepileptic and sedative	X61 AND T42.6														**0**
122	Antiepileptic and sedative unspec.	X61 AND T42.7														**0**
123	Psychostimulants	X61 AND T43.6														**0**
124	Other psychotropic	X6* AND T43.8														**0**
125	Psychotropic unspecified	X6* AND T43.9														**0**
126	Other and unspecified drugs	X64 AND T50.9														**0**
127	Other and unspecified chemicals	X69 AND T50.9														**0**
DRD	**Poisoning undetermined intent**	**ICD10-Code(s)**														**T**
128	Opium	Y12 AND T40.0														**0**
129	Heroin	Y12 AND T40.1														**0**
130	Other opioids	Y12 AND T40.2														**0**
131	Methadone	Y12 AND T40.3														**0**
132	Other synthetic narcotics	Y12 AND T40.4														**0**
133	Cocaine	Y12 AND T40.5														**0**
134	Other and unspecified narcotics	Y12 AND T40.6														**0**
135	Cannabis	Y12 AND T40.7														**0**
136	Lysergide [LSD]	Y12 AND T40.8														**0**
137	Other/unspec. psychodysleptics	Y12 AND T40.9														**0**
138	Narcotics and psychodysleptics	Y12*														**0**
139	Barbiturates	Y11 AND T42.3														**0**
140	Benzodiazepines	Y11 AND T42.4														**0**
141	Other antiepileptic and sedative	Y11 AND T42.6														**0**
142	Antiepileptic and sedative unspec.	Y11 AND T42.7														**0**
143	Psychostimulants	Y11 AND T43.6														**0**
144	Other psychotropic	Y1* AND T43.8														**0**
145	Psychotropic unspecified	Y1* AND T43.9														**0**
146	Other and unspecified drugs	Y14 AND T50.9														**0**
147	Other and unspecified chemicals	Y19 AND T50.9														**0**
DRD	**ILL defined**	**ICD10-Code(s)**														**T**
148	Instantaneous death	R96.0														**0**
149	Death not otherwise explained	R96.1														**0**
150	Unattended death	R98														**0**
151	Other ill-defined and unspecified	R99														**0**
		Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

[*)]Age groups: 1 = <15, 2 = 15-19, 3 = 20-24, 4 = 25-29, 5 = 30-34, 6 = 35-39, 7 = 40-44, 8= 45-49, 9 = 50-54, 10 = 55-59, 11 = 60-64, 12 = >=65, 13 = age unknown.

X42* = Include in DRD98, if there is an X42-code and the case is not yet included in DRD88 through DRD97.

X4* = (X40-X49)

X62* = Include in DRD116, if there is an X62-code and the case is not yet included in DRD106 through DRD115.

X6* = (X60-X69)

Y12* = Include in DRD134, if there is an Y12-code and the case is not yet included in DRD124 through DRD133.

Y1* = (Y10-Y19)

Part II: The protocol for the Special Registers

For the Special Registers, the DRD-Standard focuses on the following categories of underlying causes of death:

Underlying cause of death	Further breakdowns
Poisoning (by accident, suicide, homicide, or undetermined intent)	Opiates, methadone, poly-substances, medicines, and unspecified.
Other than poisoning	Natural/internal, accidents, suicide, homicide, and undetermined.

The protocol for extracting data on drug-related deaths from the Special Registers consists in taking four consecutive steps:

Step 1: Apply the spreadsheet

The format of the spreadsheet to report the aggregated data from the Special Registers is given in Table 4 below. For each registration year, a spreadsheet can be filled in.

Step 2: Apply gender and age breakdowns

For each year the spreadsheet is broken down by gender, cause of death, and age group. Gender is divided into male, female, and gender unknown. The age groups are (1) 0-14 years, (2) 15-19 years, (3) 20-24 years, (4) 25-29 years, (5) 30-34 years, (6) 35-39 years, (7) 40-44 years, (8) 45-49 years, (9) 50-54 years, (10) 55-59 years, (11) 60-64 years, (12) 65 years or older, and (13) age group unknown.

Step 3: Apply substance breakdown to poisoning cases

The causes of death are divided into poisoning and other than poisoning. The protocol for the other than poisoning causes is given in step 4 below. The poisoning cases are further divided by the substances implicated in death.

Beware of the fact that not all substances detected or mentioned in a case are taken

into account. Only those substances are taken into account that are considered an underlying or a contributing cause of death. Substances that are *not* considered an underlying or contributing cause of death are thus *not* taken into account to assign a case to a category of substances.

Each poisoning case is coded to only one of the six mutually exclusive categories A1 through A6:

A1. Opiates only (excluding methadone)

A case is coded to A1 if only opiates, but not methadone, are registered as a cause of death, and no other substances are registered as a cause of death. If, for example, alcohol is also registered as a cause of death besides opiates, the case is assigned to category A3 below.

A2. Methadone only

A case is coded to A2 if only methadone is registered as a cause of death, and no other substances are registered as a cause of death. If, for example, alcohol is also registered as a cause of death besides methadone, the case is assigned to category A3 below.

A3. Poly-substances including opiates

A case is coded to A3, if opiates are registered as a cause of death and one or more of the following substances are also registered as a cause of death:

amphetamines
cocaine/crack
cannabis
hallucinogens (e.g. LSD, mescaline, PCP, psilocybine)
solvents
'synthetic designer drugs' (e.g. MDMA, 2-CB, GHB and derivates)
barbiturates
tranquillisers and other nonbarbiturate sedatives (e.g. benzodiazepines)
alcohol
other substances

A4. (Poly)substances excluding opiates

A case is coded to A4 if one or more of the following substances are registered as a cause of death, but no opiates are registered as a cause of death:

amphetamines
cocaine/crack
cannabis
hallucinogens (e.g. LSD, mescaline, PCP, psilocybine)
solvents
'synthetic designer drugs' (e.g. MDMA, 2-CB, GHB and derivates)

If in addition to the aforementioned substances, alcohol, barbiturates, tranquillisers or nonbarbiturate sedatives are also registered as a cause of death, the case is still coded to A4.

If on the other hand psychoactive medicines are registered as a cause of death, and none of the above substances, and no opiates are registered as a cause of death, the case is coded to A5 below.

A5. Psychoactive medicines

To be coded to A5, no opiates, no amphetamines, no cocaine/crack, no cannabis, no hallucinogens, no solvents, and no 'synthetic designer drugs' may be registered as a cause of death. A case is coded to A5 if one or more of the following psychoactive medicines are registered as a cause of death:
barbiturates
benzodiazepines
other sedatives and minor tranquillizers

Antidepressants, neuroleptics and other psychoactive medicines are not taken into account.
A case is also coded to A5 if death is due to the combined use of alcohol and one or more of the psychoactive medicines listed above.

A6. Unspecified/unknown

A case is coded to A6 if it is unspecified or unknown which substances have caused death.

Step 4: Apply and specify other causes than poisoning

The five other causes of death B1 through B5, which are other causes than poisoning, are as follows:

B1. natural/internal (e.g. disease)
B2. accidents other than by poisoning
B3. suicide other than by poisoning

B4. homicide other than by poisoning
B5. undetermined other than poisoning

These other causes are mutually exclusive. One case may only be coded to one cause. Please specify which cases are coded to B1, B2, B3, B4, or B5.

Option to avoid laborious spreadsheet work

Filling in a sequence of spreadsheets, of which the format is shown in Table 4, may result in laborious work. Ultimately, the data from these spreadsheets will be transferred to a general SPSS database. Some programmers will be able to shortcut this roundabout route of the spreadsheets. Programming the output in the format of the ultimate general database has proven to be even less difficult than programming the output for filling in the spreadsheets.

Programmers who prefer a shortcut that will save much work for both parties, are requested to contact Guus Cruts directly at the e-mail address gcruts@trimbos.nl to obtain the codebook of the ultimate database. If output can be programmed directly according to this codebook, the spreadsheets can be skipped entirely.

Table 4: Spreadsheet format for SRs

M	Cause of death	Age group													
A	**A. Poisoning by accident, suicide,**	<15	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	>=65	?y	**Total**
L	**homicide, or undetermined intent**														
E	A1. Opiates only (excluding methadone)														**0**
	A2. Methadone only														**0**
	A3. Poly-substances including opiates														**0**
	A4. (Poly)substances excluding opiates														**0**
	A5. Psychoactive medicines														**0**
	A6. Unspecified/unknown														**0**
	Subtotal A: poisoning	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	B. Other than poisoning	<15	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	>=65	?y	**Total**
	B1. Natural/internal														**0**
	B2. Accidents other than by poisoning														**0**
	B3. Suicide other than by poisoning														**0**
	B4. Homicide other than by poisoning														**0**
	B5. Undetermined other than poisoning														**0**
	Subtotal B: other than poisoning	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Total males	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
F	**Cause of death**	Age group													
E	**A. Poisoning by accident, suicide,**	<15	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	>=65	?y	**Total**
M	**homicide, or undetermined intent**														
A	A1. Opiates only (excluding methadone)														**0**
L	A2. Methadone only														**0**
E	A3. Poly-substances including opiates														**0**
	A4. (Poly)substances excluding opiates														**0**
	A5. Psychoactive medicines														**0**
	A6. Unspecified/unknown														**0**
	Subtotal A: poisoning	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	B. Other than poisoning	<15	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	>=65	?y	**Total**
	B1. Natural/internal														**0**
	B2. Accidents other than by poisoning														**0**
	B3. Suicide other than by poisoning														**0**
	B4. Homicide other than by poisoning														**0**
	B5. Undetermined other than poisoning														**0**
	Subtotal B: other than poisoning	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Total females	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Total males and females	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

?y = age group unknown